

The Mining Journal

RAILWAY AND COMMERCIAL GAZETTE

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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No. 2280.—Vol. XLIX.

LONDON, SATURDAY, MAY 3, 1879.

WITH SUPPLEMENT. PRICE SIXPENCE. PER ANNUM, BY POST, £1 4s.

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MINES INSPECTED.

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10 Frontino, £2 6s. 3d.	150 Penruthal, 2s. 3d.	35 Van Cocks and Glyn
20 Glenroy, 5s.	100 Pestarena, 3s.	Amalgamated, 6s.
30 Herodsfoot, £2 1/2.	50 Parys Mount, 10s.	15 W. Assheton, £1 6s

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RAILWAYS—SPECIAL BUSINESS.

FOREIGN BONDS—SPECIAL BUSINESS.

Fortnightly accounts opened on receipt of the usual cover.

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ESTABLISHED 1842.

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100 Bodidris.	30 East Van, 34s.	35 Morfa Du, 15s. 6d.
40 Birdseye, 12s. 6d.	25 Eberhardt, £4 3s. 9d.	40 Nouveau Monde, 12s 6d
20 Bettwya-y-Coed.	20 Frongoch.	20 New Quebrada, 41s.
75 Chontales, 9s. 6d.	40 Frontino, £2 1/2.	100 Parys Mount, 10s. 6d
5 Cape Copper, £2 1/2.	25 Great Holway.	25 Pandora, 5s.
50 Canada Gold.	10 Great Laxey, £15 1/2.	10 Red Rock, 22s. 6d.
3 Carn Brea, £30 1/2.	100 Glenroy.	5 Roman Grav., £9 1/2.
30 Colorado, 35s.	5 Herodsfoot, £2 3/4.	30 Richmond, £7 11s. 3d.
10 Devon Consols, £2 1s.	20 Hultafall.	10 So. Frances.
70 Don Pedro, 15s. 6d.	70 Javali, 5s. 6d.	20 Wheal Pevor, £9 8 6
3 Dolcoath, £28 1/2.	50 Kapanga, 9s. 6d.	25 West Assheton.
2 D'Eresby Mountain.	25 Lead Era.	15 Wheal Grenville, £2 3/4
	40 Leadhill, £2.	

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20 Caron, £2 1/2.	15 Globe Tel. and Trust, £5 1/2.	8 So. Frances, £10 1/2.
50 Cakemore, £2 1/2.	5 Great Laxey, £16 1/2.	30 West Wye Valley.
100 Cambrian.	100 Herodsfoot.	10 Wheal Pevor, £2 3/4.
75 Don Pedro.	100 Hornachos, £6 1/2.	20 Wheal Uny, 10s.
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30 Cakemore Pref., £3 1/2.	20 Lead Era.	20 St. Harmon, £2 1/2.
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50 Canada Gold, £2.	10 Mynydd Goreddu, £3.	5 Tincroft, £10.
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20 Eberhardt, £4.	45 Parys Corpor., 10s. 9d	25 West Pevor, £3.
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CLAUSTHAL MINING SCHOOL NOTES.—No. CXV.*

BY J. CLARK JEFFERSON, A.R.S.M., W.H. SC.,

Mining Engineer, Wakefield.

(Formerly Student at the Royal Bergakademie, Clausthal.)

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SECTION V.

DAMS IN LEVELS AND SHAFTS.

There are many cases in which the water which finds its way into a mine can without disadvantage be completely dammed back, and the constant expense of pumping the water avoided. Before deciding on damming back any feeder of water it should be ascertained whether it is likely to have the desired effect, or whether it may only result in causing the water to enter the mine at the next favourable point. When a level or drift has been driven into fresh unopened ground, and has tapped a large feeder of water—say at a fault—there will be but little doubt as to the effectiveness of a dam, or the position in which it should be placed. When, however, the feeder has broken down in goafs or old workings the efficiency of a dam, and the position in which it should be inserted, will require some consideration. When a feeder of water is first discovered it should be attentively observed to ascertain whether it is likely to be a constant supply, or whether the supply is limited, and likely to cease altogether.

Dams may be made either of wood or brickwork. Wooden dams may be distinguished, according to their construction, as balk dams, in which the balks are laid horizontal, or placed vertical; folding dams; and wedge dams.

Balk dams are made of balks of wood, square or rectangular in section; the balks being sometimes laid horizontally, extending in single baulks across the whole width of the level; and in others the balks being placed vertically, each balk reaching from the floor to the roof of the level. When the height of the level is small compared with the width it will be best to place the balks vertically, and when the width is small compared with the height the balks are laid best horizontally, since the shorter the balks the greater is the head of water they are capable of resisting. When the dimensions of the level are such that the balks would be comparatively long, and consequently proportionately weaker, the dam is constructed so that two balks take the place of one previously, with this distinction, that they are inclined inwards to the side from which the water pressure is exerted, similarly to the lock gates in a canal. This description of dams we have denominated folding dams, or lock dams.

The best form of dam is that we have denominated wedge dams, forming either a truncated pyramid or cone, with the base towards the side on which the water pressure is exerted. In this case the dam virtually forms a wedge of great dimensions, and which the pressure of the water tends to force or wedge tighter in the rock.

In most cases it is necessary, or desirable, that the work of erecting the dam should be prosecuted in dry ground, and that consequently some preliminary arrangement should be made for carrying the water in a suitable channel past the place where the dam is to be erected. For this purpose a temporary dam is made at a distance of 4 to 10 yards on the water side of the place where the dam is to be erected. Here a nick from 12 to 14 in. broad and 6 in. deep is cut in the floor and in the sides of the level (to a height of from 3 to 4 ft.), 1-in. wooden planks, cut in length to suit the width of the level across the nick, are placed edgewise upon each other at the front and back portion of the nick, and extending across the whole width of the level to the height of 3 to 4 ft. A space 10 to 12 in. wide is thus left between the front and back sets of planks. This space is tightly filled by stamping in well puddled clay. This dam is sometimes unnecessarily supported by placing four or five props wedged between the roof and the floor, close against the front and back sides. By this means the water level is raised to a height of from 3 to 4 ft. above the floor of the level.

On the top, or rather let into the top, of this dam is a spout, or channel, which sloping slightly downwards from the dam, and being 8 to 10 yards in length, carries the water clear away for this length past the place intended for the erection of the permanent dam. To prevent the water after its discharge from the spouts flowing back to the spot where the permanent dam is being erected a heap (about 1 ft. in height) of puddled clay is placed across the level, about 2 ft. from where the spout ends.

When the preliminary arrangements for dams with the balks placed vertically have been completed, the sides, roof, and floor of the level are carefully dressed, either by means of pick or hammer and chisel, for the insertion of the balks. The sides are dressed vertical and in line with the general direction of the level; the roof and floor, however, are made to slope, and in such a manner that the widest side is turned towards the water. The balks of wood are sawn on three sides, being left round on that side next the water. A bed of moss is laid on the floor of the level, and covered with a plank, generally made of willow, the fibres of the wood being placed parallel to the direction of the level. The first two balks on each side are then placed in position, and driven tight up against the roof. The centre balks are then placed in position, with the exception of the last one. The balks are held close against each other, and held there by means of wooden laths nailed across them on the side nearest the water. About 4 to 5 ft. from the front of the balks a single or couple of props are driven firm between the roof and floor of the level. A long bolt, 1½ in. diameter, passes through the centre of the last balk, a nut prevented from turning by means of a clamp screws on to the bolt on the side of the balk next the water. A similar bolt, provided with a nut, passes through a cross piece placed in front of the props. Both bolts are connected by a short chain. The last balk is placed with its foot resting in position on the plank covering the moss bed, so that on tightening up the nuts on last mentioned bolts, the balk is drawn tightly into position. The next proceeding is to make the dam perfectly watertight. The joints between the balks and the sides are made tight by pressing moss into them, beginning about the centre, and proceeding upwards and downwards. After this moss is stopped into the joints in the roof, and where possible also in the joints at the floor. After this wooden wedges of willow are driven into the joints, in the same order observed in filling in the moss. Oak wedges succeed the willow wedges, and complete the wedging of the dam.

After this the bolts are unscrewed; the opening thus left in the last of the balks is plugged up, and likewise a hole in one of the balks near the roof (which has been left for the escape of the air) is stopped.

It is sometimes usual to strengthen the dam by means of props and struts. The most usual arrangement is to place three vertical props in the level, two at a distance of about 6 ft. from the front of the dam, and one at about 10 ft. in front of the dam. A couple of horizontal beams are laid across the back side of the two props, from which the balk dam is strutted by two horizontal rows of short struts, each balk being supported by two struts, one near the upper end and one near the lower end. The two props are strutted by means of three short struts against the third vertical prop in the middle of the level.

The arrangement of dams in which the balks are laid horizontal appears the oldest, and to have originated in the neighbourhood of Liège. The usual mode of dressing the ground is to cut a ledge all round the level, and to make the ledge thus formed at right angles to the general direction of the level, the side next to the water is rounded off (with the opposite side of the ledge as centre), so that by this means the introduction of the balks can be effected more easily. Sometimes the ledge is cut inclined in the direction

of the level, which is much to be preferred where the ground or rock is faulty, as the direction of the pressure is more into the solid rock.

The balks of which the dam is formed usually have a section of 15 to 27 in. square, and are made of oak or beach, which has been preserved in water, and afterwards dried. The section of the balks is not necessarily square; they are carefully planed on three sides; the side in contact with the water is not usually planed, though the corners at this side are usually bevelled off. At the Centrum Colliery, near to Eschweiler, where the level in which the dam is 5½ ft. high by 4½ ft. wide, and the head of water behind the dam from 65 to 70 ft., the balks are made of oak, 10 in. square. At the Nouvelle Haye Colliery, Belgium, in a level 5 ft. by 4½ ft., the dam is formed of three balks, 24 in. thick by 20 in. high, the head of water behind the dam amounting to 95 ft.

After preparing the sides of the dam and cutting the balks, which should be slightly shorter than the width across the two dressed sides, the laying of the balks is commenced by placing a bed of moss on the ground, and on this a plank, or board, about ½ in. thick, of poplar or similar wood, and slightly broader than the balks. On this board the first balk is laid, and wedged tight at both ends, during which it is held down by props driven tight against the roof. In some cases ½-inch planking is placed between the balks, the boards being covered with linen tarred or smeared over with some suitable composition. The second balk usually has a small round hole bored through it, to allow of the water flowing away as soon as it is found necessary to remove the provisional dam, and thus prevent the water rising to the balk which has last been laid, and thus interfering with the work. At a height of 2 to 3 ft. above the level of the floor a rectangular opening is formed by cutting two adjoining balks half their depth. Where the sides of the level are cut inclined, or the balks bear at the ends against a projection, this man-hole for the exit of the workmen, after completing the wedging of the back of the dam, is often left out altogether. The last balk is measured to suit the form and dimensions of the space left next to the roof, sufficient space being left for the insertion between the wood and the roof of sufficient moss to ensure that the joint shall be watertight. The next process after all the balks have been laid is to make the joints watertight. This is usually accomplished by driving well cleaned moss into all the crevices, and afterwards wooden wedges, an entrance being made by means of an iron chisel. The joints are, besides, covered with strips of linen well tarred or smeared over with some watertight composition. The wedges are driven in simultaneously in the dam on both sides of the level, so as to avoid altering in any way the position of the balks. Where the dam is provided with a manhole this wedging takes place on the side next the water. At the Nouvelle Haye Colliery the upper and lower balks are made deeper and longer at the side next the water, and the sides and floor being cut to suit, the dam forms a sort of wedge; the uppermost balk is provided with handles, so that it can be pulled into position by the workmen in front of the dam, and the watertight wedging is executed from the front. The manhole is closed tight by means of a block of wood cut tapering to suit the taper and section of the manhole, which is made slightly wider at the back than at the front.

MINERAL RESOURCES OF NEWFOUNDLAND.

The frequent appearance of the names of Newfoundland mines in the Swansea Ticketing lists is a satisfactory evidence of the capability of the province as a mining region, and from what is being done at Boston it would seem that the Newfoundland minerals are receiving more attention in the United States than in this country. Sir J. H. GLOVER, the Governor of the colony, appears to be very popular, and takes particular interest in the present condition and prospects of the mining industry. It is stated that he has formed a very high estimate of the capabilities of the island, and believes that a great future awaits it; and it is generally felt that since his arrival, only 2½ years ago, they have made more rapid strides than during the previous 20 or 30 years, and mainly through the energetic impulse given by the present progressive ruler. A railway survey has been completed, and 180 miles of telegraphic extension have been carried out, connecting the West Coast and the mining region with the capital, one of the most useful and important public works yet initiated. Sir John is also advocating energetically a graving dock for St. John's, capable of admitting the largest Transatlantic steamers, and has obtained plans and estimates of the work through a London engineering firm.

With reference to the mining region, it is remarked that the impression left by a visit is that Newfoundland is destined to become the Chili of North America—that ere many years elapse a new Cornwall will spring up in the northern portion of the island. The Betts Cove Copper Mine has in three years yielded 75,000 tons of ore, and shows no signs of exhaustion. The lowest workings are now 400 ft. below the surface. The extent of the excavations is perfectly astounding—sufficient, one would think, to occupy 20 or 30 years in opening them out. On reaching the first level he found himself at the bottom of a huge chamber, the roof of which was 60 ft. overhead, shaped like the dome of a cathedral. The great cavity had been scooped out by the miners, in removing the copper ore which originally filled it. Huge pillars of ore have been left for the support of the roof, and in course of time these will be replaced by wooden or stone supports, and the ore removed. How many tons of ore have been taken out of this great pocket it would be difficult to say. Galleries have been opened in various directions from this cavity, according to the run of the deposits, which are in beds, not veins; and in this way each pocket is followed until it is emptied of its contents, and a new one is then entered on. A vertical shaft was first sunk, and cross-cuts were then driven out from the shaft at right angles to the strike of the deposits. In order to reach the deeper deposits the working field is divided into various horizons or stories, the distance between two of which is from 10 to 20 fms. The levels which serve as bases to two consecutive horizons or stories are connected by workings. The lower level serves to bring in the air from the downcast shaft, and the upper level takes it back to the upcast shaft, with which it is placed in communication. The lowest level opened in Betts Cove Mine is 400 ft. below the surface.

The value of the ore already taken out of the mine is estimated at 400,000l., and last year, during which 45,000 tons of ore were shipped, nearly 100,000l. was paid in wages and other mine costs. Hitherto all the ore has gone to Swansea, where it is smelted; but six cupola furnaces, on the most approved principle, with hot-air blasts, have been erected at Betts Cove; and in future all the poorer ores will be smelted there, and raised to a regulus of at least 30 or 40 per cent. of copper before exportation. In this way the very poorest ores can be turned to account, and the expense of freight greatly reduced. A tramway of three-quarters of a mile in length connects the mine with the harbour, and over this the ore is sent for shipment. Betts Cove Harbour though small is safe, and is now protected by a breakwater. Fine wharves, half mile in length, have been erected on both sides. Great cliffs, 300 ft. in height, guard the entrance of the harbour on each side, the mouth of the harbour being a cleft in a great wall of rock. Upon a recent visit about 1000 men were employed, the population altogether being about 2000. Three years ago two small huts, owned by fishermen, were the only erections. Now there are comfortable houses for the population named; three churches, a schoolhouse, hospital, public hall, foundry, workshops, telegraph station, offices, stores, residences for the officers of the mine, a jigg mill to wash out the finer particles of the copper, a fine range of stables, &c. The Betts Cove Mining Company is now regularly organised on the principle of limited liability, with a subscribed capital of either a quarter or half a million pounds sterling. The stock is nearly all held by the same parties who have so successfully conducted operations from the outset—Mr. Ellershausen, the managing partner, who directs all operations, and to whose energy and sagacity the success of the mine is largely due; together with the wealthy Glasgow capitalists, Messrs. Dickson and McKenzie, and four others to complete the legal number for a limited liability company.

Little Bay Mine about 15 miles from the Betts Cove Mine, dis-

covered in August last, and worked by the same company, promises even to eclipse Betts Cove. When recently visited about 400 men were at work on an immense cliff of copper, some 30 ft. high and 200 or 300 yds. in length. They were literally quarrying the ore in huge blocks. Masses estimated to weigh 3 tons were lying about, which had been brought down by the blasts of the miners. An immense pile of ore was heaped up—some 1200 tons—ready for shipment, and a cluster of workmen were employed in constructing a tramway, over half a mile in length, from the mine to the harbour, down a gentle declivity. The harbour is one of the finest in the island, being 5 miles in length, with deep water almost to the shore, and completely landlocked. The situation of the mine is beautiful, far superior to Betts Cove. There is a small valley, at one end of which the houses of the workmen are erected, with tall trees all around, and a little inlet called Indian Bight in front. Upon a second visit to Little Bay Mine a month later, just six weeks from the time it was opened, the tramway had been completed, and 3000 tons of ore had passed over it, and had been shipped. Two vessels were taking in cargoes of ore at an excellent wharf, and 530 men were at work. Most of the surface development of the ore had been removed as well as 5000 tons of rock, and tunnelling underground had commenced. This will be the great mine of the future. It is ascertained that the deposits of ore are very large, and the ore averages 14.28 per cent. copper. The facilities for mining and shipping are described as unrivalled.

Since the discovery of the Little Bay Mine another valuable property has been found on the south-west arm of Green Bay, and has also been leased to the Betts Cove Company; the quality of the ore is said to be the best yet discovered, averaging from 20 to 26 per cent. of copper, equal to fine ore brought from the Cape of Good Hope. A large surface development, in the form of a ridge of copper ore, has also been found here, and of great extent. There are now eight Newfoundland copper mines in which operations are being carried on—the three just named; Tilt Cove, where the deposits are exceedingly good; Hall's Bay Mine, said to be very promising; a sixth owned by Messrs. Browning and White, which rejoices in the singular name of The Naked Man Mine, from the fancied resemblance of the hill in which it is to a human being in complete undress. This mine has been leased by a wealthy London company on a royalty of 8s. sterling per ton, and operations are going on in a very satisfactory manner. A Nova Scotia company is working two other mines, but it is not known with what results. Constant reports of new discoveries are pouring in, and as only a mere strip of the mineral region has yet been examined there can be little doubt that greater discoveries will be made in the future. The proximity to Swansea—freight being only 18s. per ton—the ease of carrying on mining operations in Newfoundland, compared with Cornwall and Devonshire; the abundance of labour, all combine to give them great advantages. Should matters progress as they have done, the country will become one of the main sources for the supply of copper ore to Britain; a race of "copper lords" will spring up who will exercise a controlling influence over the English copper market, and wealth and population will increase there rapidly.

DIRECT ACTING STAMPERS.

The invention of COLONEL BEAUMONT, of Westminster, relates to stampers employed for crushing ores or such like operations, and consists in an arrangement of cylinder and slide in combination with a stamping coffer and framing, such that the stamper is caused to reciprocate rapidly by steam or compressed air acting in the cylinder, the reversals of movement being effected by the action of the working fluid itself on the slide without any extraneous mechanism for that purpose, and that the working fluid is cut off when part of each stroke is effected, the remainder of the stroke being effected by expansion. For this purpose on a framing above the coffer he mounts a cylinder and slide resembling in their construction the cylinder and slide described for working a percussive rock drill in a former specification. He mounts the cylinder and slide in vertical guides, providing a screw or two screws geared together, by which they can be raised or lowered. To the piston rod he attaches a striker, which at each down stroke of the piston strikes the ore or material in the coffer, effecting the stamping required. By raising or lowering the cylinder by means of the screw or screws above mentioned the striker can be adjusted and wear can be taken up.

For the purpose of working expansively he arranges in the supply pipe to the slide a double beat or nearly balanced stop valve connected to a differential piston in a short cylinder. This cylinder communicates on its smallest side with the main steam pipe and on its larger side with the main cylinder by a port arranged at the required point of cut-off, so that when the main piston in its down stroke passes the port it admits fluid to act on the valve piston, closing the valve and so cutting off the supply of working fluid; and again when the main piston makes its up stroke the larger area of the small cylinder becomes open to exhaust through the main cylinder, whereupon the valve opens for supply of fluid to effect the next stroke of the main piston. The cut-off of the working fluid may also be effected by any of the known methods for that purpose. The construction of the main cylinder and slide may be varied as in known percussive rock drill arrangements wherein the reciprocation of the piston is effected by a slide acted on by the working fluid, the mounting and arrangement of such cylinder and the adaptation of the expansion valve to it being as described.

MANUFACTURE OF IRON AND STEEL.

According to the invention of Mr. W. EVANS, of Moxley, near Wednesbury, he arranges near the fire-place of the furnace a melting and refining chamber, in which the iron is melted and refined, and he constructs near the said melting and refining chamber the puddling chamber, the flame and heated air from the fire-place first passing over the melting and refining chamber, and next over the puddling chamber. The melting and refining chamber is separated from the fire-place by a bridge, and from the puddling chamber in advance of it by a second bridge, the melting and refining chamber being constructed between the said bridges. The melting and refining chamber is situated at a higher level than the puddling chamber, and the connection between the two chambers is effected by a pipe or passage inside the furnace.

The reverberatory arch of the furnace is made inclined or curved to follow the varying levels of the two chambers—that is, the said arch is highest over the fire-place and refining chamber, and lowest over the puddling chamber. Over the crown of the arch at the melting and refining chamber is a cross main pipe, and combined with the said main pipe is a series of branch pipes, which pass through the said crown of the arch, and open on the inside thereof. By means of these branch pipes a series of jets of air may be projected on to the surface of the melted iron being refined in the refining chamber so as to refine the said iron. The jets of air by mixing and combining with the gaseous products of combustion from the fire-place, passing over the bridge of the refining chamber, promote their combustion and produce an intense heat. Instead of jets of air, steam may be used, or jets of steam and air may be used. The pig-iron to be manufactured into wrought-iron or steel being placed in the melting and refining chamber, it is melted by the heat from the fire-place, and refined by the action of the jets of air or steam upon it delivered in the manner before described. The iron having been sufficiently refined, the connecting pipe or passage between the refining chamber and puddling chamber is opened, when the refined iron runs by the said pipe or passage into the puddling chamber, where it is puddled in the usual way. The charge of refined iron having been removed from the melting and refining chamber, another charge of pig-iron is placed therein, and melted and refined, and conveyed to the puddling chamber, the puddling operation being effected in one chamber, while a second charge is being melted and refined in the other chamber. It is claimed that furnaces arranged according to this invention are efficient and economical in use, and that the iron or steel produced is superior in quality to that produced in ordinary furnaces.

* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergstrath Dr. von GROEDER, Director of the Royal Bergakademie, Clausthal, The Harz, North Germany.

THE IRON INDUSTRIES OF SCOTLAND.

By RICHARD MEADE, Assistant Keeper of Mining Records,
Museum of Practical Geology.

The carboniferous system of Scotland classified geologically, consists of four principal series, thus arranged:—The Coal Measures, the Millstone Grit, the Carboniferous Limestone, and the Calciferous Sandstone series. The lower series as developed in Scotland consists of two well-defined groups, which, with occasional interruptions, have been found more or less constant throughout all the carboniferous areas of the United Kingdom. The lowest series—the Calciferous Sandstone—may be described as being composed of a lower group of red sandstones and an upper group, the characteristic feature of which is the presence of bituminous shale. Next in order of occurrence ascending appears the Carboniferous Limestone series, divisible into three well marked groups—first, an upper group, consisting chiefly of sandstones, &c., with some three or more seams of limestone; the second a middle group of sandstones and argillaceous shales, with numerous seams of coal and ironstone, but no limestone; and, third, a lower series or group of strata, with seams of coal and ironstone, and a variable number of limestones. The lower group is very variable both as regards the number and quality of its coal, ironstone, and limestone seams, and the absolute thickness of the strata in which these occur. In some districts, as in Ayrshire, one or two limestones occur in a thickness of 8 or 10 fms. of strata, and not unfrequently no coal or ironstone seams of commercial value. In other localities, as at Carlisle and along the southern borders of the Lanarkshire coal field, no fewer than eleven limestones occur in a thickness of 35 fms. of strata, while at the same time occur a number of excellent bands of argillaceous ironstone. The middle group of the limestone series is characterised by the presence of numerous coal and ironstone seams, and by the total absence of limestones. One or two seams of blackband ironstone appear in this horizon, and about midway between the top and bottom of the series occurs the celebrated Lismahago gas producing coal, yielding 13,500 cubic feet of gas of a high illuminating power from 1 ton of coal. The upper limestone group of the carboniferous series, as exhibited in Lanarkshire, has a great sameness of character in all the localities where it occurs; usually it contains three limestones, and here and there one or two lenticular and inconstant seams of the same mineral of variable qualities and thickness. Mr. James Geikie, F.R.S.E., in his interesting paper on the "Coal and Ironstone Bearing Strata of Scotland," and from which many of the foregoing facts are drawn, considers that the numerous coal seams point to the frequent occurrence of a land surface, and the gas coals and ironstones to the former existence of numerous wide lakes and lagoons. It is not uncommon to find lines and ribs of gas coal associated with our splint coals and even with some common coals. Gas coals, indeed, are not unfrequently found to pass into common coals or into black shales, and sometimes into blackband ironstones; and thus the same mineral seam may be alternately a common, splint, or gas coal, an oil shale, or a blackband ironstone, according as the physical condition varied at the time of its formation. The Millstone Grit reposes on the carboniferous limestone, and occasionally yields clay ironstone of good quality, the Curdie seam being the best known, and is an ironstone of variable thickness and purity, occurring in nodular masses. The Coal Measures of Scotland consist of two groups, the upper, consisting of a series of red sandstones, with intervening sandy marl and impure fire-clays, resting unconformably upon the coal bearing strata, and in the deeper parts of the Lanarkshire coal field attains a thickness of upwards of 700 feet. The lower or coal-bearing group is rich in coal, containing 18 workable seams; it also contains several important seams of blackband and clayband ironstones, which have been extensively wrought, and some nearly exhausted. The blackbands vary much, and do not often exceed 18 in. in thickness. In one locality, however, the Crofthead slaty band is said to have reached the thickness of 6 or 7 ft.

In the Western coal fields of Scotland seven principal blackband measures are known, occurring in the following order:—

	Thickness—Inches.
The Palace Craig blackband	12
Airdrie blackband	16
Bellside blackband	6
Kiltongue blackband	8
Calderbank or Kennelburn blackband	6
Upper slaty blackband	15
Lower slaty blackband	8

The above thicknesses are subject to considerable variation, and the same seam is rarely continuous over any large area. Thus at Airdrie it occurs in workable quantities over an area not exceeding 10 square miles, but its equivalent in the form of a thin seam of coal covers from 50 to 60 square miles. In Linlithgowshire the equivalent of the blackband ironstone is found in the celebrated Boghead canal coal, or as it is also known by the name of Torbane Hill mineral, which some years since gave rise to much litigation.

Blackband ironstone was discovered by Mr. Mushet in 1801 at Airdrie, near Glasgow, in Lanarkshire, but it does not appear to have come into general use till about the year 1830. The possible blackbands were discovered in 1838, and have an average thickness of 9 in. Subsequently in 1840 blackband ironstones were discovered in Ayrshire, giving rise to the Blair and Glengarnock ironworks, and some years later it was found extending from Dalry, in Ayrshire, to Banton, in Stirlingshire, and more recently at Lugar and Dalmellington, in Ayrshire; at Forth, Lochelly, and Lumphinians, in Fifeshire; at Borrowstoness and Almond, in Stirling, and other places.

A very important seam of ironstone was discovered last year some 24 in. thick on the lands of the Carron Company near Eastgrange Culross; the same seam was long known and worked to the east of the locality above referred to, and a search instituted for its discovery. Boring operations were carried on for several months, and at a depth of 140 fms. the efforts of the borers were rewarded by cutting this valuable seam. Some years previously similar operations were conducted by the Shotts Iron Company on the same estate, the borings being carried to a depth of 100 fms., but not meeting with the seam the company relinquished the lease. Hematite ores of iron occur and are worked in some few localities in various parts of Scotland, but to a very limited extent, due in some cases to the remote districts and the want of cheap carriage to the ironworks, and the necessary fuel for reduction. In Ayrshire hematite has hitherto been worked at Muirkirk and at Whytock; at Garleton, in Haddingtonshire, and at Sandridge, in Shetland, also in the northern counties of Aberdeen and Moray, and in Kirkcudbrightshire, at Auchencrain. The great bulk of the hematites used in the smelting works of Scotland are imported, and to these attention will be given by-and-by.

PRODUCTION OF IRONSTONE IN SCOTLAND.—The earliest information on this subject begins with the year 1855, when the Keeper of Mining Records ascertained for the first time that the production of all kinds of ironstone, clay, blackbands, and hematites amounted to 2,400,000 tons, the production of Great Britain in the same year being 9,553,741 tons. Returns since the above-named year appear below:—

Year.	Scotland—tons.	United Kingdom—tons.
1855	2,201,250	10,483,309
1857	2,500,000	9,573,281
1858	2,312,000	8,040,959
1859	2,225,000	7,876,581
1860	2,150,000	8,024,205
1861	1,975,000	7,215,518
1862	1,500,000	7,562,240
1863	1,500,000	9,088,960
1864	1,950,000	10,064,890
1865	1,470,000	9,910,045
1866	1,587,000	9,665,912
1867	1,264,800	10,021,058
1868	1,250,000	10,109,231
1869	1,950,000	11,508,525
1870	1,986,000	15,577,499
1871	2,119,771	14,844,936
1872	2,452,235	15,821,060
1873	2,552,553	16,841,583
1874	2,621,852	16,692,802

From the Returns of H.M.'s Inspectors, acting under the Coal and

Metalliferous Mines Regulation Acts, the following statement shows the respective quantities of ores of all kinds obtained in Scotland in each of the three years ending 1877:—

Counties.	1877—tons.	1876—tons.	1875—tons.
Ayrshire	856,129	860,648	853,868
Dumfriesshire	284,875	249,637	231,885
Edinburghshire	75,779	61,262	49,469
Fife	13,113	14,274	36,833
Haddingtonshire	4,340	6,224	9,899
Kinross-shire and Perthshire	31,274	41,100	14,264
Lanarkshire	803,382	779,263	747,406
Renfrewshire	180,596	185,678	170,106
Stirlingshire	172,573	162,781	143,165
Linlithgowshire	194,322	186,460	188,772
Sundries—Hematite	5,469	5,226	6,568

Total

The above shows the ironstone produce of Scotland. To render the information as complete as possible, the produce for 1877 of the several iron-producing districts is given, distinguishing the variety of ore raised, and its value at the place of production:—

Counties.	Character of ore.	Quantity—tons.	Value—£.
Cornwall	Brown hematite and spathose	4,983	2,900
Devonshire	Ditto	5,434	3,229
Somersetshire	Red hematite and spathose	51,928	36,349
Glostershire	Brown hematite	93,974	63,261
Wiltshire	Hydrated oxide	79,173	19,794
Oxfordshire	Brown hematite	14,561	2,566
Northamptonshire	Hydrated oxide	1,049,893	169,981
Lincolnshire	Ditto	50,750	78,192
Staffordshire, North	Ditto	36,993	18,496
Lancashire	Red hematite	993,013	651,170
Cumberland	Ditto	1,851,442	965,802
Westmoreland	Ditto	5,000	4,800
Yorkshire, North Riding	Argillaceous carbonate	6,284,45	1,021,238
Northumbria and Durham	Spathose and siliceous hematite	51,344	30,801
So. Wales & Monmouthshire	Brown hematite	77,320	30,472
North Wales	Ditto	498	194
Ireland	Aluminous, pyritic, &c.	155,332	85,427
Scotland	Hematite	846	60
Total iron ore produce of mines not under the Colliery Inspection Act		10,768,075	3,191,788

Somersetshire

Thus the total quantity of iron ore obtained from mines of the United Kingdom in the year 1877 was 16,692,802 tons, of the value of £7,466,682; to this must be added 415,000 tons of burnt ore, obtained from cupreous pyrites, and 1,142,308 tons of iron ore imported, giving a gross total of 18,250,110 tons smelted in the ironworks of Great Britain. In the previous year the production of iron ore was 16,841,583 tons, the burnt ore 300,000 tons, and the imported ores 672,235 tons, or an aggregate total of 17,813,818 tons. Comparing the production of the two years, 1877 shows a decrease of 148,781 tons of iron ore, and an increase of 115,000 tons of burnt ore and 470,033 tons of imported ore; these latter ores yielding not less than 60 per cent. of metallic iron.

IMPORTS OF IRON ORE INTO SCOTLAND.—Iron ore was imported into Scotland at an early period. It is recorded that in the middle of the last century considerable quantities of rich hematite ore were brought into Argyleshire from Ulverston, and there smelted by charcoal, as at the present time, by the Messrs. Ainslie at their furnaces at Bunawe. Until the year 1856 we have no precise information showing the extent of the imports; since that year, however, very complete returns are available, showing the quantities imported from Lancashire, Cumberland, and foreign countries, as follows:—

Years.	Lancashire.	Cumberland.	Foreign countries.
	Ship. Tons.	Ship. Tons.	Ship. Tons.
1856	764	15,865	—
1857	466	799	21,578
1858	713	458	11,910
1859	381	6,185	25,585
1860	725	15,163	21,202
1861	—	25,071	31,446
1862	—	52,156	47,130
1863	—	54,000	95,752
1864	—	21,595	116,357
1865	—	12,449	—
1866	—	15,247	142,254
1867	13,709	138	21,014
1868	4,365	350	31,358
1869	3,275	392	28,992
1870	4,205	404	36,993
1871	4,123	520	9,685
1872	5,278	2,196	6,532
1873	4,138	2,937	900
1874	4,528	1,781	—
1875	4,207	—	11,489
1876	7,247	—	146,723
1877	9,733	—	148,361

The iron ores imported are chiefly obtained from Spain, Italy, Portugal, and Algeria, all rich in metallic iron, yielding, as previously stated, not less than 60 per cent. The Trade and Navigation Returns for the year 1878 show a total of 1,173,860 tons of ore imported, of the value of £1,161,633. The imports in the two previous years appear below, with details of quantity and value:—

Countries from which imported.	Quantity, 1877.	Value, £.	Quantity, 1876.	Value, £.
Russia	6,339	45,486	4,869	31,094
Norway	5,805	6,421	8,749	9,927
France	2,110	9,910	—	—
Portugal	13,998	13,168	12,894	13,234
Spain	990,029	983,566	522,383	556,756
Italy	86,301	86,836	60,620	63,302
Turkey	13,403	82,334	8,108	57,577
Algeria	22,151	24,194	42,112	47,355
Other countries	2,112	4,154	12,500	17,265

Total

ANALYSES OF SCOTCH IRON ORES.—The blackband ironstone furnishes a remarkable example of commercial prosperity and source of wealth to the ironmasters of Scotland. The discovery due to Mr. Mushet, as previously stated, was made about the year 1800. They may generally be said to vary from deep brown to black in colour, and contain sufficient carbonaceous matter to effect their calcination without the aid of additional fuel; sometimes they assume a slaty structure of the appearance of canal coal. These blackbands are very valuable ores, easily and cheaply calcined in large heaps, the residue yielding from 50 to 70 per cent. of metallic iron. The blackband of Mushet occurring at Airdrie, near Glasgow, is thus constituted as determined by the analyses of Dr. Colquhoun. Side by side is given some other analyses of blackband ironstones of Scotland:—

Constituents.	1.	2.	3.
Carbonic acid	35.17	32.71	32.61
Protoxide of iron	53.03	47.31	42.02
Lime	3.33	1.79	3.65
Magnesia	1.77	1.73	3.54
Silica	1.40	1.20	4.40
Alumina	0.63	.80	2.64

Peroxide of iron	0.23	—	—
Bituminous matter	3.03	10.40	9.12
Protoxide manganese	—	1.67	.82
Phosphoric acid	—	.59	.46
Water	1.41	1.80	0.74

Total

The foregoing analyses give respectively of metallic iron 40 per cent., 36.80 per cent., and 32.68 per cent. Mr. St. John V. Day, C.E., in his exhaustive paper on the ironstones of Scotland, gives a very complete series of analyses of the clay and blackbands of Scotland, of which the following abstract will show the metallic iron contained therein in some varieties, and other results:—

Clayband Ironstones.	1.	2.	3.
Metallic iron	36.80	30.87	25.40
Yield of calcined ore	72.16	70.39	68.53
Metallic iron in ditto	51.00	43.84	37.19
Silica in calcined ore	14.03	16.77	21.30

Blackband Ironstones.	1.	2.	3.
Metallic iron	25.19	32.62	34.56
Yield of calcined ore	61.28	58.20	56.41
Metallic iron in ditto	41.10	50.04	61.27
Silica in calcined ore	20.24	.90	3.76

The hematite ores imported from Spain are obtained from the neighbourhood of Bilbao and Santander. Some varieties occur in the carboniferous limestone in a compact massive state, and also in the deposit of drift in a nodular state; this latter variety is generally known as "small," while the former is known as "rock ore." The following analyses have been selected from many, and generally represent the composition and character of these rich ores.

Constituents.	1.	2.	3.
Peroxide of iron	80.06	70.10	78.80
Protoxide of iron	5.42	—	—
Silica	2.00	13.66	5.55
Manganese	2.10	3.65	.65
Alumina .....	.40	6.33	3.50
Lime	—	.22	trace
Magnesia	—	.23	trace
Sulphuric acid	—	—	.07
Carbonic acid	3.21	—	—
Water combined	6.71	5.71	11.65

Total

The Santander ores contain from 72 to 74 per cent. of peroxide of iron, and the Muriedas ore, in the same locality, from 84 to 85 per cent., the former yielding of metallic iron 51 per cent., and the latter from 58 to 59 per cent.

The ores of Italy, from Tuscany, give 80 per cent. peroxide of iron, 1.80 per cent. oxide of manganese, 10.78 per cent. of silica, and 2.28 alumina, and yield 56 per cent. of metallic iron. Portuguese ores give 67.42 per cent. peroxide of iron, 17.48 per cent. of alumina, 7.79 of silica, and yield 47.20 per cent. of metallic iron. Algerian ore gives 71 per cent. peroxide of iron, 11.09 per cent. of lime, .74 alumina, and 1.87 per cent. of silica, the yield of metallic iron being 49.70 per cent.

The Lancashire and Cumberland ores, by far the most important of the hematites employed in the Scotch furnaces, amounting to fully two-thirds of all imported, are thoroughly well known, having been examined in the laboratory of the Royal School of Mines, and the results published in the "Iron Ores of Great Britain," part i. This memoir, however, has long been out of print, and not being accessible for reference, the subjoined details of analyses are appended for comparison. The analyses selected were made by Mr. John Spiller and Mr. A. Dick, and are thus described:—Hematite, Lindal Moor, near Ulverston, Lancashire. "The sample from which this analysis was made was selected from a large quantity of ore, consisting of various degrees of hardness, the majority of which were of the hard compact variety, deep greyish-purple in colour, and covered with a brownish-red unctuous powder; there were also small quantities of fibrous hematite and specular iron, together with quartz and a little earthy matter."—Spiller. The Cleator Moor, Cumberland, being a "compact red hematite, easily scratched by a file; lustre, earthy; colour, purplish-grey; streak, bright red; fracture, uneven, showing cavities lined with crystals of specular iron, and containing in some cases quartz."—Dick. Results tabulated:—

Constituents.	Lancashire.	Cumberland.
Peroxide of iron	94.23	95.16
Protoxide of manganese .....	.23	.24
Alumina .....	.51	—
Lime .....	.05	.07
Magnesia	Trace	Trace
Phosphoric acid	Minute trace	Trace
Sulphuric acid .....	.09	Trace
Bisulphide of iron .....	.03	Trace
Water hygroscopic .....	.39	—
Water combined .....	.17	—
Insoluble residue	5.18	5.68

Total

Insoluble residue

Silica

Alumina

Peroxide of iron and lime

Total

Iron—total amount

It is further remarked, in reference to the first-named analyses, that a distinct trace of arsenic was detected in 1680 grains of ore; while as regards the Cumberland ore a most minute trace of lead was detected in 400 grains.

Future notices will give an account of the manufacture of pig-iron from an early period to the present time, with details of production and materials employed in Scotland.

A PNEUMATIC EXCAVATOR.—During the construction of the Tay Bridge considerable difficulty was experienced in sinking the cylinders for the piers, several expedients having been successively tried and abandoned. At length Mr. Reeves, one of the engineers engaged on that great work, succeeding in devising an excavator of the pneumatic principle, by means of which the sand was raised up from within the cylinders and discharged into hoppers, the cylinders following down the displacement of the sand. The apparatus consists of a pair of cast-iron cylinders 4 ft. in diameter, carried on a staging and placed in connection at their tops with an air-pump driven by a small steam-engine. The connections are so arranged that the air can be exhausted either from one cylinder singly or from both at the same time. The bottoms of the cylinders are connected with a suction tube 3½ in. in diameter, which leads down to the sand. Here again it is so arranged that the cylinders can be worked either singly or in combination by means of self-acting valves. The soil is discharged from each cylinder by a trap-door placed in its front. The engine and air-pump are carried on the same framing, and the whole forms a very compact arrangement. In operation, the engine being started, the air is exhausted from one cylinder; the sand and soil rushing up into the vacuum thus created soon fill the cylinder, the fact being indicated by a tell-tale. The connection is then made between the air pump and the second cylinder, and that is similarly filled, during which time the contents of the first cylinder are discharged, and it is ready for the air pump by the time the second cylinder is full; and so the process continues alternately until the desired end has been attained. The excavator worked very successfully; a vacuum of 24 in. was maintained during exhaustion, and the cylinders were rapidly filled with sand and water from a pit, the contents being quickly discharged. Besides the Tay Bridge, this excavator has been advantageously used at the Dundee Esplanade, where a considerable quantity of land was reclaimed by its aid. It also succeeded in pumping the sand from a wreck at Fraserburgh, which led to the recovery of the vessel. In

nace, and then puddled into bar iron of every description which may be required. It is claimed that the process will improve the quality of all iron made by it.

**WATSON BROTHERS,
MINEOWNERS, STOCK AND SHARE DEALERS, &c.
1. ST. MICHAEL'S ALLEY, CORNHILL, LONDON.**

In the year 1843, when mining was almost unknown to the general public, attention was first called to its advantages, when properly conducted, in the "Compendium of British Mining," commenced in 1837, and published in 1843, by Mr. WATSON, F.G.S., author of "Gleanings among Mines and Miners," "Records of Ancient Mining," "Cornish Notes" (first series, 1862), "Cornish Notes" (second series, 1883), "The Progress of Mining," with Statistics of the Mining Interest, annually for 21 years, &c., &c. In the Compendium, published in 1843, Mr. WATSON was the first to recommend the system of a "division of small risks in several mines, ensuring the success in the aggregate," and Messrs. WATSON BROTHERS have always a selected list on hand. Perhaps at no former period in the annals of mining has there been more peculiar need of honest and experienced advice in regard to mines and sharedealing than there is at present; and, in this connection, the lengthened experience of Messrs. WATSON BROTHERS they are glad to offer, thus publicly, their best services and advice to all connected with mines and mining.

Having agents in all the mining districts, they are constantly getting mine inspected for their own guidance, and will also obtain special reports of any particular mine for their clients, for the inspecting agent's fee of \$2 2a.

Diodorus the historian, writing of the mines worked by the Carthaginians in Spain before the Christian era, says—"The labour employed to come at these mines, and to dig the gold and silver out of them, was incredible, for the veins of these metals rarely appeared on the superficies; they have to be sought for and traced through frightful depths, where very often floods of water stopped the miners and seemed to defeat all future pursuits." But avarice is as patient in undergoing fatigues as ingenious in finding expedients. By pumps, which Archimedes had invented when in Egypt, the Romans afterwards threw up the water out of these kind of pits, and quite drained them. Numberless multitudes of slaves perished in these mines, which were dug to enrich their masters, who treated them with the utmost barbarity, forced them by heavy stripes to labour and gave them no respite day or night. Polybius, as quoted by Strabo, says that in his time upwards of 40,000 men were employed in the mines near Nova Carthage, and furnished the Romans every day with 25,000 drachms, or 85*l.* 7*s.* 6*d.*

COALS.—We believe Richmond and other mines get their principal supply of coke from England, and enormous quantities must be used daily in the smelting furnaces of the various mines, and more still will be required as the supply of timber falls off. It is as well to know, therefore, that there is a very large coal area in Utah, and in a few months, when a railway is completed from the colliery and cokeworks to the railways connecting San Francisco with New York and with most of the surrounding mines, the San Pete coal fields, belonging to the Central Pacific Coal and Coke Company, will be able to supply almost any quantity required. The coal field belonging to the company in Utah includes upwards of 6000 acres of freehold land, 4080 acres of which has been valued by Mr. Shone, M.E., F.G.S., and mineral agent to the Duke of Westminster, who went over specially to survey it, at 278,830*l*. The estimated value of the entire property of the company (including the railway) is 512,030*l*., and the estimate of profit when in full work is 145,260*l*. a year. The share capital of the company is 500,000*l*. And to make the railway, at a cost of 90,000*l*., they are issuing 1250 debenture bonds of 100*l*. each, secured, as a first charge on the whole of the property, and bearing interest at 8 per cent payable half-yearly in London. To each bond also is attached two fully-paid up shares of 20*l*. each as a bonus. They have been, and are, subscribed for privately, and to give the English board the preponderance in management the vendors transfer to the Hon. Ashley G. Ponsonby and others, as trustees, 100,000*l*. of the shares in trust for the purpose of voting thereon, and as a guarantee for the completion of the railway, and each debenture will carry ten votes at the general meetings. The English directors are of the highest standing, and include Sir Henry Tyler, who has thoroughly investigated the affair, and will see that this railway is properly carried out.

A correspondent calls our attention to the circumstance that in Prince Bismarck's new tariff lead is the only article admitted into Germany duty free.

SATURDAY, APRIL 26.—Market very dull. Van, 19 to 20; Great Laxey, 15 to 16; Tankerville, 3½ to 3¾; Roman Gravels, 8¾ to 9; Herodsfoot, 3 to 3½; South Frances, 10 to 10½; South Condurrow, 11½ to 12; Dolcoath, 27 to 29; West Frances, 5 to 5½; West Basset, 4½ to 5; Grenville, 3½ to 3¾; Poorer, 8½ to 9½.

Monday, April 28.—Market continues quiet. Carn Brea, 29 to 31; South Corn-durrow, 11½ to 12; Dolcoath, 27 to 29; South Frances, 10 to 10½; Tinerfoot, 1 to 10½; Peevor, 9 to 9½; West Frances, 5 to 5½; Herodsfoot, 3 to 3½; Roma-Gravels, 8½ to 9; West Chilverton, 2 to 2½; Van, 19 to 20; Aberllyn, 10 to 12; Great Laxey, 15 to 16; Richmond, 7½ to 8½; Eberhardt, 4½ to 4¾; Don Pedro

TUESDAY, APRIL 29.—Market again quiet, and prices almost nominal. Roma Gravel, 8½ to 9; West Chiverton, 2½ to 3; Great Laxey, 15 to 16; Van, 18 to 19½; Tankerville, 3½ to 3¾; Leadhills, 1½ to 2½; Herodsfoot, 3 to 3½; Egan Van, 1½ to 1¾; South Frances, 9½ to 10 (ex div. 12s. 6d.); South Condurrow 11½ to 12; West Frances, 5 to 5½; Peever, 9 to 9½; Grenville, 3½ to 4; Agna 3½ to 3¾; Mellanear 3¾ to 4; Marke Valley, 10s. to 15s.; Devon Conals

WEDNESDAY, APRIL 30—The discovery in Herodsfoot, in the 190 north, has caused a great demand for shares, which closed firm at 2 to 4. Tin shares continued very quiet, and prices the same as yesterday.

FRIDAY, MAY, 2.—Market for tin shares steady. Herodasfoot firmer. Dolcoath 27 to 29; South Condarrow, 11½ to 12½; South Frances, 9½ to 10; Peevor, 9 to 9½; West Basset, 4½ to 5; West Frances, 5½ to 5¾; Grenville, 3½ to 4; Abbe

The following calculations show the yield per cent. on money invested at present prices in the shares named, based upon the last average yearly dividends being maintained. In oil companies Dalton would yield 5, Oakbank 63, ditto (new) 63, Uphal 23, and Young's Paraffin 104. Ariston Colliery would yield 94, Cairnbarrow Gas Colliery 19, Phospho Guano 83, Scottish Wagon 84, ditto (new) 138, Abernethy Sulphur and Gunpowder 8, and ditto (new) 138.

2000%, or less, unless problems arise during mining or processing. The price of manganese ore has increased to 4000 tons per tonne. The present market value of the ore is \$7.40 per ton, or 18,000¢. The company's cost of production is about 60¢ per ton. The surface rental for the property is \$1.2¢ per ton. The striking cost, including all sundries and contingencies, is about 10¢ per ton. The total cost of production is about 70¢ per ton. The company will not consider over 100 percent on the company's capital of 10,500. It may be mentioned that two samples of the manganese have been assayed by Mr. W. B. White, M.P.E., and the first sample gave 70 percent for peroxide of manganese and the second 65 percent. The company is now planning to open up a new mine. The company is now planning to open up a new mine. The company is now planning to open up a new mine.

The company is now planning to open up a new mine. The company is now planning to open up a new mine. The company is now planning to open up a new mine.

to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

MANUFACTURE OF IRON AND STEEL.—The invention of Mr. W. DRAKE, of Sheffield, consists in refining and making malleable iron direct from the cupola by mixing therein with a special compound of old wrought scrap iron or Bessemer or other steel with the pig metal sufficiently smelted to amalgamate and become malleable when drawn out of the furnace for cast-iron malleable purposes, and also in mixing metal made by the same compound with scrap iron or steel to be run down an inclined step channel into a puddling furnace.

llyn, 10 to 12; Van, 18½ to 19½; Great Laxey, 15 to 18; Herodfoot, 3½ to 3¾; Roman, 3½ to 4; West Chiverton, 3½ to 4; Mellanear, 3½ to 4; Santa Barbara, 3½ to 4; Don Pedro, 14s. to 16s.; Richmond, 7½ to 7¾; Cape Copper, 27 to 28.

MR. WILLIAM H. H. WATSON begs to offer his advice and services to Shareholders and intending Investors in Mines, and in the Purchase and Sale of Shares.

Address: W. H. H. WATSON, 1, ST. MICHAEL'S ALLEY, CORNHILL, LONDON, E.C.

FOREIGN MINES.

RICHMOND CONSOLIDATED.—Telegram from the mine at Eureka, Nevada: Week's run, \$55,000, from 975 tons of ore. Dore bars from refinery, \$50,000.

R. Rickard, April 10: Since my last, work in the mine has been carried on with the usual regularity. The 400 drift, on quartzite, has been advanced 37 feet without change, with the exception that the quartzite is somewhat wider, being at the present time the full width of the drift. Work has been suspended in the 400 north-east from the cross-out for the time being, and a rise started from the back of the same, which has been raised 40 ft., all the distance in more or less ore, and showing good indications for the development of a large ore body. A cross-out has been started from the 200, on quartzite, to intersect the rise being put up from the 400, also to explore the ground standing between these two points. The 600 south cross-out has been extended 10 ft. without any change to notice. The 600 north, on fissure, has been drifted 29 feet, still in favourable ground. The 600 south, on fissure, has been extended 12 feet without any change to notice. The drifting of the 600 underneath No. 12 chamber has been resumed; it is now in hard limestone. The 900 north cross-out has been drifted 18 ft. in mixed quartzite and limestone. The ore chambers are looking very well, especially the No. 11 in the upper part, where it is developing into a large body of ore. The furnaces are doing good work. The smelting capacity of the large new furnaces has reached the immense quantity of 85 tons for one furnace in the 24 hours. All the machinery both in the mine and smelting works in good working order.

FRONTINO AND BOLIVIA.—April 30: The directors have received letters and mine report from Mr. Robert B. White, and his brother, Mr. Franklin White. The disturbances referred to in Mr. White's last report are ended. The mines appear to have been kept at work with little interruption in the usual mining operations, but the works of development have been somewhat hindered. The mine accounts and remittances will probably reach England by the mail arriving at the end of May. Mr. Franklin White's report shows that the produce for February was 1099 ozs. 12 24ths, dwt. of gold dust, and the total cost, including the price paid for gold bought and the amount spent on capital account (\$2882. 6s. 8d.), under the circumstances this may be considered very satisfactory. It is a noticeable feature in Mr. Franklin White's report that during the month of February the Silencio ore gave an average of 3 ozs. 2 24ths dwt. per ton, and that the average produce per ton on the whole of the mines worked by the company was 1 oz 3 34ths dwt.

ANTIOQUIA (FRONTINO).—The directors have received a letter from Mr. R. B. White, in which he reports a considerable improvement in the produce of the mine. The disturbances referred to in Mr. White's last communication are happily at an end, and the mine accounts and remittances will probably reach England by the end of May.

GOLD RUN (HYDRAULIC).—Telegram from the superintendent: We have cleaned up after a run of 23 days: produce, \$6750.

PLACERVILLE.—I. Thomas, April 7: During the past two weeks ending this date the main shaft has been sunk 14 ft., making a total depth of 489 ft. The winze has been sunk 6 ft., making a total depth of 110 ft. The fourth level has been driven north 14 ft., making a total length of 89 ft.

MINERAL HILL.—Mr. Plummer, April 8: Our operations during the past week have been confined to breaking ore in the North Giant and hauling out the broken stuff preparatory to driving a level through the quartz at this point. Union District: There is no change to report. We are down 45 ft. below the 100 ft. level. The ore is about the same in quantity, but the ground is getting softer, one side of the shaft requiring timber. We have stopped sinking.

BIRDSEYE CREEK.—G. S. Powers, April 6: I sent you yesterday the following cablegram: "We have cleaned up after a run of 30 days. Gross, \$2500; profit, \$2250." Of this work, Mr. Plummer, April 8: Our operations during the past week have been confined to breaking ore in the North Giant and hauling out the broken stuff preparatory to driving a level through the quartz at this point. Union District: There is no change to report. We are down 45 ft. below the 100 ft. level. The ore is about the same in quantity, but the ground is getting softer, one side of the shaft requiring timber. We have stopped sinking.

COPIAPO.—H. Vivian, March 14: Duquinea Mine: The yield in the winze within the last few days has greatly fallen off in value, now yielding 2 tons of ore per fathom although the lode is 4 ft. wide, and from present appearances I have every confidence that this change is only temporary. The 150 end south has improved since my last, now yielding 3 tons of rich ore per fathom. This level north is poor. At the 40 north the lode is about 3 ft. wide, and yields 2 tons of ore per fathom. The end south of shaft at this level is poor. At the 30 we have cut into the lode about 2 metres, but up to date have not met with any ore. There is no material change in any other part of operation. —Chico: Price's Shaft: In the winze sinking under the 80 the lode continues about 2 ft. wide, but during the last few days it is of little value, at present producing about 3 tons of ore per fathom. The 70 end has been driven 30 metres east of shaft through unproductive ground; for the present we have suspended driving it. We have commenced sinking a winze under the 50 on south lode. I am pleased to say the lode is looking promising, and yielding about 4 tons of ore per fathom. By sinking this winze we shall open up steeper ground. Stopping east and west of rise the lode has improved a little during the last few days. I am sorry to inform you that we have not yet recovered anything good at the 40, having driven about 2 metres on the course of the lode; it contains a little ore, but nothing to value. There is nothing new from the silver mine.

TOLIMA.—Frias: February returns show a profit of 9342. 18s. 4d. The underground agent reports 4 fms. 2 ft. 1 in. of ground expended, of which 15 fms. 0 ft. 3 in. were unproductive, leaving 29 fms. 2 ft. 10 in. of productive ground. The agent, whilst explaining that the diminution in the month's returns is attributable to the breakage of the crusher and the shaft of the water-wheel, goes on to say: "Never have I seen the mine looking so well as it does at present, extraction and development go hand-in-hand, and the result is a satisfactory appearance underground, and a good show of ore in sight, more particularly in the section of the mine east of the engine-shaft." The underground agent reports that in the Alto gold mine, in a run of 14 days, 1808 ft. more of bed-rock were cleared, and a weight in gold amalgam obtained of 32 ozs. 5 dwts. 12 grs.

ISABELLE (Gold and Silver).—Lewis Chalmers, April 7: I enclose foreman's report to me for last week, from which you will see that I had to take the men from the face to get ready for the machine drills, laying piping, grading for same, putting in timbers, laying track, and as I wish to have no stop when I do commence, I am putting things in such shape that there shall be no excuse for it. I spend four to six days a week, day and plan, and plan, and plan, and everything attended to myself, but I make the foreman report to me every Saturday, and that is the report I send you. —Foreman's Report: We have done no work in face of tunnel, the men have all been employed putting up timbers, laying track and drains, getting everything ready for a start with machinery, so that we may have no interruption. All outside work being done would of necessity have to be done before the winter months come. We are doing it at less expense now than we could at any other time, and are endeavouring to make a good job of it. The work is all running in harmony.

COLUMBIAN (Hydraulic).—W. S. Weston, March 18: Malpas Mine: During the last week we have passed through a hard piece of ground, which has been our great obstacle since we opened operations at this point, and in proportion as the hard bottom, consisting of sand streaks and fine gravel, gets lower the bed of good coarse gravel resting on this gets thicker, and we have already quite a fair bank of good gravel. Under these circumstances, and considering the short time run, I have resolved to leave the clear up until the 28th inst.

—March 29: Run No. 56, from Feb. 28 to March 28, 29 days, during which washing was carried on for 16 hours, has produced \$707 63 (43½). The gold obtained was in very coarse form, and gave the very high produce of \$5 015 per ounce amalgam. As yet we have only reached a corner of the high bank on account of the hardness of the ground, but the sand streaks have cut out in the bottom, and the gravel has become soft at the most distant point reached, and we shall certainly come into a good face of gravel very shortly.

—March 28: Malabar Mine: Run No. 25 from Feb. 20 to March 20, 29 days, during which washing was carried on for 425 hours, has produced \$523 62 (104½). The second piece of sluice only produced 15 ozs. of amalgam, although it had not been cleared up for two runs. Taking this into account, the average produce was better than for run 24, but, as the sluice for run No. 23. The small amount of amalgam obtained from No. 2 sluice I consider was owing to the new riffles in the upper sluice catching more of the gold. The bed-rock continues to dip, and the pipe-lift is getting much less as we go in. The gravel is also more coarse than previously, and there is every appearance of getting into better ground.

PESTARENA UNITED (Gold).—April 24: District Val Topps: The end in Zero level driving south, on the cañon branch, is without change. —Western Lode, Intermediate Level under Zero: The lode in the end south is of a fair size, worth, as per last trial, 1 dwt. 12½ grs. of sponge gold per ton. The lode in the end north continues poor. In No. 1 level end south we have an improvement. The lode in the end south in No. 2 level continues promising, with stones of ore. —Intermediate, under No. 2 Level: The end south of winze is not looking so well. The lode in the end, north of No. 3 level, is about 6 in. wide, of quartz. —New and Flat Lodes: In No. 2 level, in the end south of 1st cross-out east, on the flat lode, continues to yield 2½ tons of ore per fathom, worth 1 oz. of gold per ton. In No. 1 level we have resumed work at the end south, on the Marmosa lode, which is yielding stones of ore. The lode in the end of No. 3 level is much the same, the men having been employed in cutting down the corner of ground to cross-out and putting in tramroad. The stopes on the flat lode, under No. 3 level, continue to yield rich ore, and all the other stopes are producing their usual quantity of average ore. —District Pestarena: The 100 has been drained, and work resumed there

in the first place to repair the level. At both the Pestarena and Val Topps establishments all is going on well, and a fair quantity of amalgam is being made.

SENTEIN.—The managers report (April 26, that from the lode in No. 4, St. Eugene level end we have broken for the week 35 tons of silver lead and blende ores. There is no change here worthy of note since last week; lode looking well. We are pleased to say the stopes in the back of No. 3, St. Eugene level, are improved, one of which is greatly improved, and it will yield fully 12 tons of silver lead and blende ore per fathom for the width of the lode—9 ft. From this stopes we have broken 25 tons of ore, and from the other stopes about 15 tons of ore, making a total for the week of 40 tons, by 20 miners. At the dressing floors we are making as much progress as we possibly can in every department, but we have not been able to do much outdoor work, in consequence of the bad state of the weather, having continual falls of snow and rain throughout the whole week. At the road to the mine we have done but very little this week. Total quantity of ore raised to date 2235 tons.

ALMADA AND TIRTO CONSOLIDATED SILVER MINING COMPANY (LIMITED).

MINA GRANDE.—Capt. Morcom, Feb. 17: The end driving north of the Black ore stopes is passing through a splendid lode, worth 40 tons per cubic fathom. Feb. 24: The end driving north of the big Black ore stopes, below tunnel level, continues to look well. The stopes are poor, being in a bad bar of ground, which we shall soon get through.

March 3: The end driving north of the Black ore stopes is worth 20 tons per fathom. The stopes in the bottom are still in a poor part of the lode, which we shall very shortly get through.

March 10: There has been no change taken place in the end driving north in the big Black ore stopes below tunnel level. We know nothing of its width (the lode). The end is 7 ft. high, and 6 ft. wide—nearly all solid black ore. The full productivity of the lode we shall know when it is excavated by stoping. It is a fine-looking lode, and will, I doubt not, be met with in the 12 ft. level, when driven. This fine course of ore appears to be dipping to the north and west. We shall naturally watch with great interest the future explorations in this part of our mine.

LA VIRGEN.—Feb. 17: The stopes is suspended until it can be filled up and made secure. The cross cut through the lode east is looking well—that is, above and south of the present stopes.

Feb. 24: The cross cut east through the lode has met with no change. We shall probably be through it in a few days. The stoping of the back will be resumed shortly.

March 3: The cross-cut east has passed through the lode, which is 7 ft. wide. The men are now put to stoping the back in the old stopes, where I am sorry to say the ore is almost exhausted.

March 10: The stopes on the east part of the lode continues much as usual, yielding a great deal of second-class green ore.

LA PROVIDENCIA.—Feb. 17: The stopes in back of tunnel level has fallen off a little in value. There are now indications of it again improving.

Feb. 24: The stopes has not undergone any change as regards green ore since last week. It produces, however, a little more black ore, which appears to be of a very good ley.

March 3: The big green ore stopes above tunnel level is getting less productive.

March 10: In the big green ore stopes, which is now 80 ft. above tunnel level, and 40 x 12, no falling off in value has taken place during the week; on the whole, it has probably a little improved.

SAN PEDRO.—Feb. 17: The rise from tunnel level towards old green ore left in former workings is making fair progress; we rose 9 ft. last week.

Feb. 24: Fair progress is being made in the rise towards the old green ore. The rise from the back of tunnel level. Another 20 ft. will probably reach the old stopes. This rise we are pushing on with all speed, as we are badly in want of green ore.

March 10: Fair progress is being made in the rise.

FIRST LODE, TIRTO.—Feb. 17: The lode fluctuates considerably in value. I fear it will never make a profitable one. At times it has a very nice appearance, but subject to frequent changes.

Feb. 24: The end driving north of the winze has much harder than usual. The lode produces green ore in sufficient quantities to pay for extraction.

March 3: The end driving north of winze below tunnel level has fallen off a little in value.

March 10: The lode in the end north of the winze has a little improved in value.

CRUZ VERDE.—Feb. 24: The shaft sinking below the first level does not improve in value as it lately indicated it would. The ore part is so irregular that we cannot feel confident of its not being shot out with the next blast that may take place.

March 3: The sinking of the shaft has been suspended for awhile until we get into the lode at a different point, in order to prove if better rock exists elsewhere, otherwise we must suspend it, as the ground is very expensive to sink through, and the lode of little value.

March 10: The end driving north contains a little more ore than for some weeks past. We are looking for an improvement as we advance towards some pillars said to be left between the present end and an old shaft at Dios Padre. The stopes in the back are fairly productive of low grade ore. The shaft remains idle.

BURROWS.—Feb. 24: The stamped stuff from the Mina Grande burrow is turning out well—that is, from the south-west trench.

TRIBUTOS DEPARTAMENTO.—March 3: The tribute department at San José is looking very poor. The tributers will soon give up their pitches, as it does not pay them to work.

March 10: Tribute pitches much as usual, except at San José, where the ore is almost all taken away.

J. H. Clemen, Feb. 19: Capt. Morcom mentions a slight improvement in green ore main stopes. The black ore stopes is looking well. It appears probable that the northern dip of the Mina Grande ore bunch is stronger than has so far been counted on here, so that the extension of paying ore in that direction may be greater than has hitherto been supposed. A fresh contract has been let to some tributers on the dump—hunting select small. Of the common smalls we have not yet packed down a biddable. The trenches are making fair progress.

March 8: A very marked improvement has shown itself in the black ore prospects—an improvement that will enable us to draw up a much more hopeful report than the last one. For details please see Capt. Morcom's weekly reports. The half-year's report will treat fully of the black ore workings and of the dump. The open trenches occupying a long time in reaching the interior of the dump, on account of the continuing rolling in of debris from the slides, a small shaft has now been started, with a view to investigate the pile. This will throw extra light on the matter.

THE MINERAL RESOURCES OF NOVA SCOTIA.

The report of the Government Inspector of Mines in Nova Scotia

—Mr. H. S. POOLE, F.G.S., A.R.S.M.—for the year ended Dec. 31

has just been issued, and contains a considerable amount of valuable

information. It appears that during the year there were 45 gold

mines at work, upon which 110,422 days' labour, with 31 mills and

20-horse power steam and 11-horse power water, were expended.

The quantity of quartz crushed was 17,990 tons, which yielded

12,577 ozs. 1 dwt. 22 grs. of gold, or at the rate of 13 dwts. 23 grs.

per 18 cwts. on the average; and the average yield per man per day

for the 12 months, valuing the gold at \$18 per ounce, was \$2.05.

The maximum yield was in the Oldham district, where in one case

a yield of 9 ozs. 8 dwts. 20 grs. per 18 cwts. was obtained; high pro-

duces were also obtained in Wine Harbour, 8 ozs. 13 dwts. 14 grs.;

in Uniaque, 6 ozs. 2 dwts. 9 grs.; in Sherbrook (one-third of the

mines are located in this district, and nearly half of the aggregate

work is done therein), 5 ozs. 2 dwts. 17 grs.; and in Tangier, 4 ozs.

2 dwts. 18 grs. The stuff worked was about the same in quantity

as in 1877, but it was little more than two-thirds as rich. Mr. Poole

reports that the distinctive features of the gold leads of Nova Scotia

are their general conformability with the slate and quartzite beds,

and their regularity suggesting that they are rather beds than veins.

But there are characters that point to their being true veins in spite

of these features—the roughness of the planes of contact between

quartz and slate and quartzite, the crushed state of the slate or gneiss

on some footwalks, the irregularity of their mineral contents, the

terminations of the leads the effects of contemporary dislocations,

and the influence of stringers and offshoots on the richness of the

leads—characters that singly or collectively it would be difficult to

account for, associated with a stratified deposit.

Excepting gold and coal, the two chief branches of the mining

industry of Nova Scotia, the other mineral resources of the province

may be briefly referred to. Mr. Poole states that the other most

important branch, the iron trade, has been conducted with increased

energy by the Steel Company of Canada at Londonderry. One fur-

nace has been steadily kept in blast, and in the mill a quantity of

bar-iron has been produced, which compares favourably with the

best brands of imported iron. The prospecting for lead resulted

unfavourably at Caledonia, the vein becoming even smaller and

poorer under the river, and the rock so wet as to compel the aban-

donment of the operations. Nor was the search at Pembroke for

lead more successful. Copper mining remains at a standstill, though

the discoveries at Polson's Lake recently warrant a hope that before

long copper mining in Nova Scotia will be regularly established.

The usual quarries of gypsum, freestone, &c., have been worked, and

have produced about the usual average quantity. Barytes has been

mined on a small scale at Greenfield, on the Intercolonial Railway.

The successful operations being carried on at the Marble Mountain

of Cape Breton were fully referred to in last week's Mining Journal.

The coal produce for the year was 770,603 tons, in raising which

in exportation. Nova Scotia struggled for a portion of the trade with the West Indies and South America, as was noticed in previous reports, but was overpowered by her powerful competitors controlling return freights. Referring to the remedies which have been suggested Mr. Poole points out that the conditions involved in the direct and indirect advantages to the trade, and in the gain and loss to the country at large by an import duty on coal, are so many, and the whole question is so involved, that he does not attempt to classify and consider them; but he says that it might fairly be asked whether a tax which checked importations from Great Britain would not so raise the rate of freight up the St. Lawrence as to practically defeat the end in view, and increase the homeward freights on grain and lumber. It is also questionable whether a tax would stop the importation of hard coal, which Nova Scotia cannot supply. It is certain that by it the exports would not directly be increased, and it is also certain that with it the Western consumer of coal must pay for it or go back to the use of wood. A bounty is referred to as being preferable to an import duty.

The question of carriage by rail has, Mr. Poole thinks, hardly been fully considered, and points out that some 4000 trucks which carry flour, &c., from Toronto, Chicago, &c., at \$55 per truck of 100 barrels, go back West empty, and cost \$6 each for haulage. He suggests that the coal could be bagged and carried at \$2.10 per 18 cwts. as back freight, which would give the railway \$21 to pay the \$3 haulage cost and for extra wear and tear, and allowing 50 cents for bags would permit of Nova Scotia coal being sold at \$4.30 per 18 cwts. at Toronto. It is improbable that land carriage could ever, as Mr. Poole supposes, compete with water carriage between the points mentioned if anything like \$2.60 be added for freight and bags; but considering all the circumstances there would appear to be no reason why the railway should not construct trucks suitable for carrying coal in bulk, and flour and general freight also, in which case if they took the coal as back freight at \$1 per 18 cwts., including everything from the Nova Scotian coal fields to Toronto, they would get their back haulage for nothing, representing \$6 per truck profit, or \$24,000 per year, and of the balance of \$1 per truck the extra cost incurred would certainly not exceed \$2, so that there would be an additional profit of \$8000 per annum. The coal at the pits' mouth sells at \$1.70, so that the total cost at Toronto would be \$2.70, at which price there would be no difficulty in competing with the United States coal, which has lately been sold at the exceptionally low price of \$3.35 at Toronto. If it could be arranged, as was formerly done by the Great Northern Railway Company in England, for the railway company to act as merchants, and supply dealers along the whole route, dividing profits above \$2.50—that is, \$1.70 for the coal and 80 c. for haulage—an enormous impetus would be given to the Nova Scotian coal trade, the profits of the railway would be increased, and the whole Dominion would be benefited enormously.

WROUGHT-IRON FRAME STAMP MILLS.

In the present depressed state of the iron trade nothing is of greater importance than the finding of new applications for the metal, and for this reason especial interest attaches to the proposal of Messrs. Morey and Sperry, of Broadway, New York, to employ wrought-iron for the framing of stamp mills. In countries like England, where the timber usually employed has to be imported, whilst the wrought-iron can be readily obtained at home, the advantage of the substitution is obvious, and it is scarcely less so with regard to countries in which skilled labour being with difficulty obtained, it is essential that the stamp batteries being once fixed they should require the least possible subsequent repairs. Until within the past two or three years the cost of wrought-iron excluded its use in very many important places. The price at present enables Messrs. Morey and Sperry to make the frame for a stamp mill of wrought-iron, and successfully compete with the wooden frame in price, and make the battery very much better than by the use of wood, especially as in most instances the timbers of which a battery frame is to be made are used almost immediately without seasoning. When such timbers are used, although put together by the most skilled workmen, they shrink and open at the joints. Soon the whole structure becomes shaky, the nuts upon the bolts jar loose, requiring constant attention. These defects are all overcome by the use of wrought-iron in the construction of the battery frame. The pillow blocks for the cam shaft and the projections for the guide girts are made of cast iron. In every joint in the whole structure of the wrought-iron frame they use a vulcanised fibre of ½ in. thick. This material being slightly elastic, successfully prevents the transmission of the jar through the frame, and by the use of washers of the same material the nuts will not jar loose from the bolts. They do not use rivets in any portion of the structure. They use hard wood guides, which are bolted to the wrought-iron girts in the same manner as in the wooden frame by collar bolts. Castings are bolted upon the wrought-iron posts, forming the rest for the bolt hinge to the latch sockets. The latches are made of hard wood and fitted to their sockets, and can be removed at pleasure, and be replaced without disturbing the adjoining latches. They do not furnish the wooden foundation or sills upon which the posts stand, and to which the turnbuckle braces are attached from each side of the posts.

The cams are made double or single arm as may be desired. Heavy wrought-iron bands are shrunk upon the hubs, and are fitted with steel keys. The tappets are double faced, and provided with steel gibbs and keys. The heads or bosses are banded at each end with heavy wrought-iron bands. In all first-class mills they furnish crucible steel shoes and dies, which are exceedingly hard and tough, and will wear from two to three times longer than any of the hard iron mixtures. Every part of these batteries is put together at the shop, and finished, marked, and taken down for shipment, and can be put up ready to run in three days after the foundations have been prepared. These mills are especially adapted to localities where large timbers cannot be easily obtained, and in very many localities where timbers are abundant, if time be of any object, as it requires no skilled millwrights to erect them. They furnish complete working drawings, with instructions for putting in the foundations. The price for a ten-stamp wrought-iron frame battery as above, f.o.b. in New York, is under 3500. Total weight about 11 tons. Requiring 15 to 20 horse-power to run the stamps. These mills crush wet hard rock through screens of 1600 holes to the inch, 20 tons in 24 hours. They are furnishing all the machinery for a ten-stamp gold mill of 450 lb. stamp, including steel shoes and dies, wrought-iron frame, portable boiler and engine complete, of power sufficient to run the same; counter-shaft and pulleys, tightening pulley, belting; high California gold mortars with copper inside; four sheets of copper for outside tables; making all ready to put up, which can be done in one week in most localities; and all of first-class workmanship for 4500, the total weight being about 12½ tons.

RENDERING ARCHES AND TUNNELS WATERPROOF.—A composition formed by the admixture of about equal parts of coal-tar pitch, Archangel pitch, Stockholm tar, cotton seed oil, anthracene oil, and resin is proposed by Mr. HAMOR LOCKWOOD, of Manchester, for rendering arches, tunnels, &c., impervious to water. The composition being well mixed and heated, a coating of the same about ½ in. thick is first laid on the top of the arch or bridge, and then a light coating of varnish applied hot, followed by a layer of brattice cloth, then another coat of varnish, and next a layer of roofing felt, and a third coat of varnish, after which he applies a second coat of brattice cloth, and finishes off with a ½-in. coating of the first-named mixture or composition.

GENERAL MARKETS.—The only change of any very great importance this week is in Egyptians, which have all had a very heavy fall. "United" have fluctuated between 45 and about 38. Egyptian Preference between 63 and 55½. There has been no special cause for this "scarce" beyond large amounts of stocks sold partly for delivery and partly as "bears." The dividend is announced for payment on the United Bonds at the rate of 5 per cent. per annum. Turkish of 1871 have also fallen in sympathy with Egyptians; all, however, have recovered somewhat after the fall. English railways keep steady, but there is not much doing in them. Great Northern, North British, Caledonian, and Metropolitan all show some improvement for the week. South-Eastern are about 1 per cent. lower, but others show little change. Consols are not so firm, the price to day being 99½ to 99¾. In mines the chief business has been in Herodfoot, which has advanced to 3½, 4. Tin and copper mines are dull. —H. H. WATSON, 1, St. Michael's Alley, Cornhill, E.C., May 3.

Mining Correspondence.

THE REMAINING 1000 SHARES OF THE FIRST ISSUE ARE NOW OFFERED AT PAR.

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* With this week's Journal a SUPPLEMENTAL SHEET is given, which contains—Original Correspondence: The Commission of Enquiry on Colliery Accidents; Safety Lamps (W. E. Teale); Colliery Management (B. Pickard); the London Coal Supply (W. J. Thompson); Ore; Lead and Copper; the Wynnad India Gold Fields; Gold Mining in Brazil (F. Dietzsch); the Tharsis Sulphur and Copper Company; Saba Sulphur Mine, West Indies; Is it Right to Pay for Purchase Money for Mines? (W. Johnson, H. D. Hoskold, J. F. Pagen); Successful Mining and Successful Miners (R. Trevellick); Sketches of Cornwall—Historical, Biographical, and Topographical—No. II.; Important Discoveries in Cardiganshire Mines; Circumstances which affect the Metallic Portions of Lodes (O. Bawden); Welsh United Mines (A. Francis); Meetings of Public Companies: General Mining Association, Fuller's Reef, Roman Gravel, Herodsfoot, West Basset, Temple, Phoenix, Blue Tent, Fall Creek. Improvements in Dynamo-Electric Machines (illustrated). Foreign Mining and Metallurgy; Mining Corves and Wagons, &c.

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The Mining Market: Prices of Metals, Ores, &c.

METAL MARKET—LONDON, MAY 2, 1879.

IRON.	£ s. d.	£ s. d.	TIN.	£ s. d.	£ s. d.
Fig. sm. f.o.b. Clyde.	2 3 6	—	English, ingot, f.o.b.	65 0 0	—
" Scotch, all No. 1.	2 4 0	3 0	" bars	65 0 0	—
Bars, Welsh, f.o.b. Wales	4 15 0	5 0 0	" refined	65 0 0	—
" " " " " "	2 6 0	—	Australian (nom.)	71 0 0	—
" " " " " "	5 0 0	7 0 0	Straits	65 0 0	65 10 0
" " " " " "	5 0 0	5 10 0			
" Swedish, London	8 10 0	8 15 0			
Rails, Welsh, at works.	4 15 0	—			
Sheets, Staff., in London	7 10 0	7 15 0			
Shops, ship., in London	5 12 6	—			
Hoops, Staff.	6 15 0	7 2 6			
Wall rods, Staff., in Lon.	5 15 0	6 5 0			
STEEL.					
English, spring	13 0 0	19 0 0			
" cast	8 0 0	10 40 0			
Swedish, keg	13 0 0	—			
" fag. ham.	15 0 0	—			
LEAD.					
English, pig, common	13 15 0	14 0 0			
" " "	14 5 0	—			
" " W.B.	15 0 0	—			
" sheet and bar.	14 15 0	—			
" pipe	15 10 0	—			
" red	17 10 0	—			
" white	25 0 0	—			
" patent shot	18 10 0	—			
Spanish	13 7 6	—			
NICKEL.					
Metal, per cwt.	18 0 0	20 0 0			
Ore, 10 per cent. per ton	24 0 0	26 0 0			
QUICKSILVER.					
Flasks of 75 lbs., ware.	6 2 6	—			
SILVER.					
Spanish, 15 0 0	—	—			
English, Swansea	15 0 0	—			
Sheet zinc	19 10 0	20 0 0			

* At the works, 1s. to 1s. 6d. per box less for ordinary; 10s. per ton less for Canada; 1s. 6d. per box more than 10 quoted above, and add 6s. for each X. Terms—plates 2s. per box below tin-plates of similar brands.

REMARKS.—During the month of April our markets showed little change, and prices for most metals, though at times somewhat fluctuating, were quoted at the end about the same as they were at the beginning of the month, and the prevailing tone of the market now is no better than it was then, neither does the prospect of the trade appear to have improved, and, in face of the great depression, supplies come forward as freely as ever, and as long as this over-production continues it must necessarily be followed by further depreciation. Suppliers do not seem to take the least notice of the great change which has come over the trade of this country, and the markets are not only overburdened with stock, but additions are continually being made to them. Buyers have lost all confidence in the stability of prices, and very many sellers share their misgivings. Consumers show no more inclination to come forward now than formerly, and their purchases are still limited, and the instability of prices offers no inducement to regular buyers to lay in stock, and they evidently prefer abiding their time, and take their chance of being forced into the market, and run the risk of having to pay higher prices than to anticipate their requirements. There was very little speculation all through the month, and this was not at all surprising, considering the few favourable opportunities that presented themselves for speculation in all metals. A third, or the first portion, of the year having passed away without producing any good effects or displaying any signs of improvement, it is thought by many that the markets will drag on the same listless state until the ensuing autumn, and as the summer months more often than not prove periods of quietude, and there is nothing to lead to the expectation that they will prove otherwise this year, it seems very probable that the long anticipated revival will be postponed beyond that season.

COPPER.—The tendency of this market is downwards, and Chili bars have been sold as low as 55s. 15s. per ton, and this is not in the least surprising considering the heavy supplies which are continually being pressed forward for sale on the market. The imports of Australian copper are also very large; and, judging from the present tone of our market, are much more than is likely to be required for some considerable time to come. It is very strange that producers should continue to overload the market when it is so palpable that depreciation in value must necessarily follow, and what their object is in pursuing the course they are now doing is repeatedly increasing their stock it is impossible to say. It cannot be done out of ignorance of the results of such a course, for they are all well aware that the excessive depreciation that has already taken place in the value of this metal has been chiefly caused through over production. At present the Chilean bar has made no impression on the exports from Western America, for the charters for the last fortnight are telegraphed at 3100 tons, of which 2100 tons are bars, 850 tons furnace material, and 150 tons bars for the Continent. The price is reported at 54s. 15s. against 53s. 9s., and the exchange at 53s. 4s. 4d.

The enhanced quotations which were ruling a short time back, and which were occasioned through speculators having come forward on the production of higher prices ruling from the expectation of the West Coast production being diminished, has now been succeeded by lower rates, and a marked shyness prevails amongst all speculators. According to the statistics published on the 29th ult., the stock of Chili and Bolivian copper in Liverpool and Swansea has decreased to the extent of about 300 tons, and is now estimated at 28,840 tons, against 29,147 tons, on April 15, and 19,660 tons on April 30, 1878. The total imports into this country for the first three months of the present year are above the quantities imported in the same time of 1878 and 1877, whereas the exports are less. The imports are reported at 23,840 tons, against 19,267 tons in 1878, and 21,673 tons in 1877, whereas the exports are only 11,802 tons, against 15,983 tons last year and 14,904 tons in 1877. These returns are most unfavourable, for they show an increase in the imports and a decrease in the exports. However, the statistics showing the total are rather more satisfactory, for the quantity now amounts to 52,271 tons, against 55,744 tons last month, or showing a decrease of 1478 tons.

IRON.—The general state of this market is without change, and though the Middlesbrough masters keep tolerably firm in their quotations makers in other districts display a good deal of eagerness to secure orders at even a trifle below the official quotations, and as soon as the Durham strike ends it is not at all unlikely that that sellers in this producing part of the country will become again weaker in their prices, for no permanency can be relied upon where makers in only one district raise their quotations, as buyers will undoubtedly pass them by, and place their orders where they can get them executed most advantageously in the way of price. There has been sufficient proof all through the long depression in the trade that this will undoubtedly be their course, for in most instances consumers have stifled down their prejudice against foreign iron, and purchased it in place of English, simply because they have been able to buy it cheaper than that produced by home manufacturers. Therefore, if the Cleveland makers wish to obtain more contracts than they have been doing of late, it seems highly improbable that this result can be brought about by raising their quotations yet awhile. There is very little business doing on the Middlesbrough market, and speculation has almost entirely abated. Makers of pigs, however, do not make very much change in their quotations, some quoting No. 3 at 40s., and No. 4 at 38s., whereas others are only asking 39s. for No. 3, but it is difficult to realise above 38s. 6d., and some sellers have executed shipping orders at this reduced rate. It is reported that an increase has been made in stock in Messrs. Wm. Connell and Co.'s stores in this district to the extent of 708 tons. The total stock now amounts to 88,208 tons, with warrants in circulation for 82,350 tons.

Some masters have arranged with their men for arbitration as a means of settling the strike, and thus they keep a few of their furnaces alight. There are already said to be 35 furnaces out of blast, and many more are expected to be damped down in a short time. A few firms have been partially closed during the week, in consequence of the difficulty of obtaining both coal and coke at reasonable rates. The manufactured trade shows no alteration, and prices remain nominal, and shipments have been much reduced. A rather brisker tone is reported to be prevailing in South Wales, and the clearances are slightly better, and there appears to be a general belief existing in this district that an improvement will shortly set in, though it may, perhaps, be only to a slight degree. The demand and prices for coal remain without change, and railway iron continues dull of sale at last week's figures. The various reports from the other manufacturing districts are without change, and railway iron continues dull of sale at last week's figures. The various reports from the other manufacturing districts are without change, and tend to show the little work that most masters have to employ their men with. The Glasgow market has slightly fluctuated. It opened on Monday

at 43s. 6d. cash, being 6d. above the price at which it closed last Friday, and rapidly advanced to 44s. 10s. 6d., when it reached 43s. 7s. 6d., but a slight rally again occurred, and 43s. 9d. was paid, when a relapse set in, and 43s. 5d. had to be accepted, and now the market closes at 43s. 6d. per ton. An increase is reported to have taken place in Messrs. Connell and Co.'s yards in this district of 16,145 tons, which brings the total stock up to 251,983 tons, with warrants in circulation for 232,195 tons.

SHIPPING.	Tons	11,795
For the week ending April 26, 1879	11,795	8,382
For the week ending April 27, 1878	11,795	8,382
Increase	3,413	—
Total increase for 1879	36,198	—
Imports of Middlesbrough pig-iron into Grangemouth:—	—	—
For the week ending April 27, 1878	6,426	—
For the week ending April 26, 1879	1,880	—
Decrease	4,546	—
Total decrease for 1879	15,943	—

In blast April 26, 1879 87
In blast April 27, 1878 92

TIN.—The market for foreign tin is very quiet, and sellers are offering to sell at reduced rates, and it is not unlikely that the recent large arrivals may tend to increased weakness. Yesterday the English smelters announced their intention of reducing the discount hitherto allowed for cash on English tin from 2½ per cent. to 1½ per cent., and the brokerage from 1 per cent. to ½ per cent. only. The object of reducing the discount appears to be more for the purpose of shortening credit than for any other reason, which is a step in the right direction, as the system of long credit has recently been found to be particularly objectionable, and the change thus far is both sensible and sound, but as regards the reduction of brokerage or commission we fail to see the advantage to be derived by sellers in making such an alteration, and it at the same time deprives the commission agent from obtaining a reasonable compensation for his time and outlay. Agents are, therefore, now placed at a greater disadvantage than before, and that was quite bad enough, for the low prices lately ruling have afforded very small returns, but now even these, insignificant as they were before, are to be halved. The future prospects of commission houses are consequently anything but satisfactory, and it would have been better that the rate of commission had been left untouched, and it is perfectly evident that if any change was necessary it should have been made in the form of an addition instead of a reduction, and the smelters would have done well to have again fixed it at 1½ per cent., and thus encourage and not discourage those whose business it is to work up orders. The greater the number of buyers in a market generally causes greater interest to be taken in an article, but if sellers begin to establish exclusive terms they will soon drive buyers away to seek a substitute, and the commodity will be utterly neglected. The modern practice of endeavouring to dispense with the services of the middle man is bad in principle, and not calculated to impart strength to the market, and both consumers and producers will be long find out that both sides are losers instead of being gainers, as this has already been proved by direct dealings. However, in times of depression it is, perhaps, a little excusable if rather hard measures are resorted to, but when a little more experience is gained the mistake will become more palpable, and no doubt it will then be put perfectly right. English tin is now quoted at 64s. per ton, and only a limited business has been transacted at last Friday's deliveries of foreign quantities that holders will undoubtedly have considerable difficulty in maintaining prices if this continues much longer.

LEAD.—This market continues very dull, and the imports are excessively large, and consequently check any advance in prices, and sellers are evidently eager to effect sales at quotations somewhat below ruling rates.

SPELTER.—There is no new feature in the state of this market, and buyers are very scarce, at ruling rates.

STEEL.—The tendency of this market is rather on the decline. TIN-PLATES.—But a moderate business is transacted in tin-plates, at last week's figures.

QUICKSILVER.—The export demand has been on a large scale, and the price is unchanged, at 6s. 2s. 6d. Firmness is likely to prevail, for our home consumers, who have of late not purchased much, must buy soon, and there is every probability of a continuance of the demand for shipment, inasmuch as the present price permits exports to all parts of the world, with the one exception of China, which regularly draws its supplies from California.

COPPER.—Messrs. RICHARDSON and Co. (May 1) writes:—The stocks of Chili copper produce remaining unsold at Swansea on April 1 were—Ore, 1447 tons; regulus, 7994 tons; copper, 2967 tons. The arrivals during the month were 645 tons of copper, and the private sales were 1951 tons regulus and 353 tons of copper. The present stocks are—Ore: Chili, 1447 tons; Cape, 1184; New Quebrada, 531; Spanish, 327; Portuguese, 120; Australian, 160; British, 100—3869 tons; regulus, 6043 tons; and copper, 3243 tons. These totals represent about 6750 tons of fine copper. There have been two sales of Cape ore—On the 9th, 410 tons, 11s. 0s. 6d. per unit, for a produce of 31½ per cent.; on the 23rd, 510 tons, 10s. 11s. 6d. per unit, for a produce of 30½ per cent. There have been several private sales of ore and regulus—3000 tons of New Quebrada, at 10s. 6d. and 11s. per unit, according to produce; 300 tons of Chili regulus, at 11s. 6d. per unit; 200 tons of Chili regulus, at 11s. 9d. per unit; 600 tons of Mexican ore, at 11s. 3d. The most noteworthy feature as affecting the copper market was the announcement on the 4th of war having been declared by Bolivia and Peru against Chili. This news caused some excitement, and bars went up in price 20s. per ton, and several hundred tons of metal for forward delivery fetched from 58s. to 59s. 12s. 6d.

The upward movement, however, did not last many days. About the middle of the month ordinary brands changed hands at 57s. 10s.; favourite marks, 57s. 15s. to 58s., and have since gradually declined to 56s. for g.o.b.s. The sale of Wallaroo advertised on the 22nd was partially withdrawn, prices not being satisfactory to the sellers. What was sold fetched 62s. 10s. 8d. for Wallaroo; 61s. 19s. 9d. for Barra. The balance was afterwards sold privately at 62s. 10d. for the former, and 62s. 0s. 3d. (cakes) and 61s. 19s. 7d. (ingots) were average prices of the latter. The charters advised since our last issue have been as follows:—For the last half of March, 760 tons bars and ingots, 650 tons in ore and regulus for England, 600 tons bars and ingots, 600 tons bars and ingots, 50 tons in ore and regulus for France; for the last half of April, 2100 tons bars and ingots, 850 tons in ore and regulus for England, 150 bars for France. This latter coming upon a dull market caused an unfavourable effect.

Messrs. FIDLEY and ABELL—GOLD: The arrival at the close of last week from India was rather in excess of the demand; consequently about 125,000 oz. was sent into the Bank. Yesterday, however, the French exchange declined to a point that permitted the export of gold to Paris, and as there was no supply on the market 180,000 oz. was withdrawn from the Bank: the total withdrawn since our last Circular being 229,000 oz. in bars, French coin, and sovereigns. The P. and O. steamer has brought 241,480 oz. from India, and the Medway 58,000 oz. from the West Indies. SIXTY: During the week a fair demand has existed for silver for India, and also for the Continent; the supplies being very moderate, the price has become firm, at 50s. 6d.; the Indian exchanges are, however, reported as slightly lower this morning, and the inquiries for the East have a little slackened. The arrivals comprise about 75,000 oz. from New York, and 20,000 oz. from the West Indies. The P. and O. steamer sailing to-day takes 109,000 oz. to Bombay. Mexican dollars have improved in value, there having been a good demand for China and the Continent; the price which we last quoted, 45s. 4d., rose to 49s. 4d. per oz., at which rate the 64,000 oz. by the West India steamer were sold. The P. and O. steamer takes 148,280 oz. to Chili and the Straits. Exchange on India for banks drafts at 80 days' sight is 1s. 7s. 10d. per rupee.

The MINING SHARE MARKET has been moderately active this week, but there is not much variation in prices generally. Thursday being May 1 there was a holiday in the stock and share markets. The mines mostly dealt in have been Herodsfoot, Roman Gravel, South Frances, South Condurow, Wheel Peavor, Tankerville, and a few others, but quotations generally are merely nominal.

TIN remains dull, and the standard for ore has declined 1½, yet there is probably more doing in this class of shares than in others. At West Basset meeting the accounts for three months showed a working profit of 1387½, and which reduces the balance against the company to 14,952½. The tin sold for the quarter—239 tons—realised 8239½. Carn Bras are quoted 29 to 31. Dolcoath, 27 to 29; the meeting here will be held next week, and a small dividend is expected. East Pool, 10 to 10½; Penstruthal, 1s. 6d. to 2s. 6d.; South Condurow, 12 to 12½; South Frances, 9½ to 10; Tincroft, 10 to 10½; West Basset, 4½ to 5; Wheel Basset, 1 to 1½; West Frances, 5½ to 5½; Wheel Agar, 3½ to 4½; Wheel Grenville, 3½ to 4; Wheel Peavor, 9 to 9½; West Peavor, 2½ to 3.

COPPER MINES have not been largely dealt in, and prices are merely nominal. West Tolgus, 25 to 27; at the meeting on Tuesday there was a loss shown on the two months' working of 111 7s. 4d., and a balance in hand of 1595½. The copper sold (524 tons) realised 2605½. The returns to come into next accounts amount to 2007½, or 500½ less than the present, owing to an accident to the pitwork, so that the bottom of the mine was flooded for about three weeks. Mellanear, 3½ to 4; Wheel Crebor, 5s. to 7s.; Bedford United, ½ to ½; Devon Great Consols, 1½ to 2; Hington Down, 1½ to 1½; Marke Valley, 10s. to 15s.; West Seton, 6 to 7. Pary's Copper Corporation, ½ to ½; at the special general meeting of Pary's Mountain, held on Friday, the resolution for winding up, &c., passed at the last meeting was unanimously confirmed.

LEAD is dull, and lead mines generally have been weaker with very little business doing, except in one or two prominent mines. Vans are quoted 18½ to 19½; the sale of lead and blende for the month has realised 4180½. Herodsfoot, 3½ to 3½; at the meeting, particulars of which will be found in another column, the accounts showed a balance of assets over liabilities of 663½ 9s. 10d. The ore sold for two months, 55 tons, realised 719½ 10s. 2d. The best parcel of 38 tons brought 14½ 2s. per ton. This ore was ex-

plained was raised at a cost of under 6000. The report was very favourable, and in addition to the discovery lately made in the 160. The 190 north has now come into ore, and reported worth 3 tons per fathom; this is in whole ground for 200 fms. in length, and will be an important addition to the mine if it continues. Aberllyn, 10 to 11; Bettwa-y-Coed, 20s. to 25s.; Broddidra, 1½ to 1½; East Van, 1½ to 1½; Glenroy, 7s. 6d. to 12s. 6d.; Gorseod, 2½ to 3; Great Holway, 4½ to 5; Great Laxey, 15 to 16; Leadhills, 1½ to 2½.

Minera, 9½ to 10½; Roman Gravel, 8½ to 9; Tankerville, 3 to 3½; West Chiverton, 2½ to 3. Bwlch United, 25s. to 30s.; the 60 and 70 fm. levels are both in good lead ore. At Pateley Bridge the ends on Rake and Fielding's veins are looking very prosperous. South Darren has sold 45 tons of lead, at 14½ 6s. 6d. per ton. Gwynnynydd, 4 to 4½; Caron, 1½ to 2½; Grogwion, 2½ to 3; Hartington Moor, 1½ to 2; Mawston, 1½ to 2; Red Rock, 1½ to 2½; St. Harmon, 1½ to 2½; South Cwmystwith, 2 to 3. Wye Valley, 1½ to 1½; this mine has sampled 40 tons of lead ore. West Wye Valley, 1½ to 1½. Frongoch, 2½ to 2½; this mine will sell 120 tons of lead ore on the 7th inst. D'Ereshy Mountain, 30 to 40; Clementina, 1 to 1½; Denbighshire Consolidated, 1½ to 1½.

FOREIGN MINES.—Arundal, 3½ to 4½; Blue Tent, 2½ to 2½; Cape Copper, 27 to 28; Colorado, 1½ to 2; Don Pedro, 14s. to 16s.; Eberhardt, 4½ to 4½; Frontino and Bolivia, 2½ to 2½; Hultafall, 2 to 2½; Last Chance, ½ to ½; New Zealand Kapanaga, ½ to ½; New Quebrada, 1½ to 2½; Panulcillo, 25s. to 30s.; Richmond, 7½ to 7½; Santa Barbara, 2½ to 2½. Placerville, 2½ to 2½; the shaft is here down 489 ft. Blue Tent, 2½ to 2½.

The Market for Mine Shares on the Stock Exchange has naturally been very limited, but considering that the May-day holiday fell on Thursday the week has been so entirely broken that the amount of business done cannot be regarded as unsatisfactory. The prospects are considered to show continued improvement, and it is reported that more than one enterprise likely to prove attractive to capitalists will be placed upon the market within the next ten days.

Rio Tinto Spanish Coupon Bonds, 66 to 68; Seven per Cent. Mortgage Bonds, 15 to 15½; shares, 3 to 3½; the report of the directors prepared for presentation at the meeting on Friday has been issued. The result of the working in 1878 contrasts favourably with 1877, when the deficit was owing partly to large constructive works, and partly to unfavourable prices for produce. The adverse balance is reduced to 58,479 8s. 6d. Having regard to efficiency, further reduction in general expenditure is not anticipated. Of Spanish coupon bonds 244,220 were cancelled to Dec. 31, and 1,936,780 is now outstanding. Of the 7 per cent. bonds 30,300, nominal were drawn for payment at par during 1878, and 914,980 is now outstanding. During 1878 steady and important progress has been made in the development of the mines. The output was 871,107 tons in 1878, against 771,751 tons in 1877. The last year's report held out the anticipation that the produce of metallic copper by local treatment at the mines would reach 4000 tons. This anticipation has been fulfilled, and the quantity actually made was 4006 tons, of 1000 kilograms, which is equivalent to 4416 tons, of 21 cwt. net, after making allowance for draft and moisture. It must be remembered that in 1878 the plant and appliances for the production of copper began during previous years, were by no means completed, so that the 4416 tons of 1878 afford no just criterion for the probable production of the present and succeeding years. This is shown by the fact that the production of the four months of 1879, ending April 30, or one third of the year, amounts to 2385 tons, of 21 cwt. net. So much being thus already secured, and a good water supply in store, the directors feel justified in expecting that the locally-made copper in 1879 will exceed that of 1878 by not less than 2000 tons. The quantities brought to market and realised were—in 1876, 976 tons of 21 cwt. net metallic copper. In 1877, 2495 tons of 21 cwt. net metallic copper; and in 1878, 4184 tons of 21 cwt. net metallic copper. The railway and pier continue in good condition and full working order. All necessary repairs are kept up and charges reduced to a minimum.

Canada Gold, 2 to 2½; it is said that Mr. Lockwood reports that 150 men in the drifts will produce 50 ozs. of gold per day, equal to 1800 in value. That gold can be reached in a month from the time that sinking is commenced, and that the works should be self-supporting in two months.

Santa Barbara, 2½ to 2½; at the meeting at Liverpool, on Wednesday, a dividend of 1s. 6d. per share was declared, which, with the interim dividend of 1s. per share already paid, gives 25 per cent. per annum on the paid up capital of the company for 1878. A great improvement is reported to have taken place in the lode at the bottom of the shaft, which is now 15 ft. wide. Frontino and Bolivia, 2½ to 2½; Mr. Franklin White's report shows that the produce for February was 1099 ozs. 12½ dwts. of gold dust, and the total cost, including the price paid for gold bought and the amount spent on capital account (2038½ 6s. 6d.), under the circumstances this may be considered very satisfactory. It is a noticeable feature in Mr. Franklin White's report that during the month of February the Silencio ore gave an average of 3 ozs. 2½ dwts. per ton, and that the average produce per ton on the whole of the mines worked by the company was 10 x 3 2 dwts. The directors of Antioquia have received a letter from Mr. H. B. White, in which he reports a considerable improvement in the produce of ore. The disturbances referred to in Mr. White's last communication are happily at an end, and the mine accounts and remittances will probably reach England by the end of May.

The Old Telegraph of Utah Mine scheme (Mines d'Argent de Bingham) has been so adversely referred to that certain French correspondents are "surpris et plus que surpris" by Mr. Bredemeyer's change of tone with regard to the property as indicated in his letter in last week's Mining Journal; but it is a fact that Mr. Bredemeyer's surprise is not at all surprising, since the very important facts which Mr. Bredemeyer furnishes prove beyond question that his valuation is erroneous. Mr. Bredemeyer states that at the end of June, 1878, Mr. L. E. Holden (this is the gentleman called Holden at the Paris meeting) was the manager and principal owner, and that it comprised the No. 9 Don't, Nez Perce Chief, Old Telegraph, Montreal, and Gretna mines. Probably the French capitalists, by this time acquainted with "Holden's leaching process," which attaches greater value to the mine. On Oct. 10, 1878, Mr. Bredemeyer stated that Holden was treating 100 tons of ore per day, and obtaining 15,000 ozs. (the average of 12,000 and 18,000) of silver per 30 days, but Mr. Bredemeyer shows indirectly that these 15,000 ozs. could only have been obtained at a heavy loss, for 100 tons per day for 30 days gives 3000 tons as the ore from which the 15,000 ozs. of silver was extracted, and he says that the concentration costs less than \$1.25, and leaching less than that, so that estimating \$1 per ton of crude ore as the cost of treatment will certainly not be unfavourable to the mine, adding to this \$1.50 for freight there is \$2.75, which on 3000 tons \$7500, and estimating \$1 per oz. for the bullion, there would remain but \$250 per ton of crude ore to pay for mining, superintendence, and all other outlay, which is a lower price than is at all usual in Utah. The series of 14 assays given by Mr. Bredemeyer shows moreover that whilst at the 230 ft. level the ley of the ore averaged 82.38 ozs. of silver per ton, at the 420 ft. level it averaged but 18.65 ozs. per ton, but Mr. Bredemeyer adds—"Do not imagine that the 300,000 tons of ore spoken of above are all of the same kind as that represented in the 14 samples analysed; but assuredly there is a great deal of good ore in sight, sufficient to net \$100,000 in four months in place of 30 days, as Mr. Goodspeed said. The quantity and quality of the ore are too irregularly distributed to make it possible to reach a very near estimate of the value of the same." These being the principal recorded facts upon which Mr. Bredemeyer bases his valuation, it is obvious that his estimate is—a mistake.

Richmond, 8½ to 9; the usual telegram from the mines at Eureka, Nevada, states that the week's run was \$55,000, from 975 tons of ore. During the week the refinery produced \$30,000. It is said that a further dividend will be declared in the course of the ensuing week. The manager reports that all the work in the mine is going on with the usual regularity. A rise has been put up 40 ft. in the 400 north-east from once out, and all the distance has been in more or less ore, and good indications for the development of a large ore body. The ore chambers are looking very well, especially the No. 11 in the upper part, where it is developing into a large body of ore. The furnaces are doing good work; the smelting capacity of the large new furnaces has reached the immense quantity of 85 tons for one furnace. All the machinery, both in the mine and smelting works, is in good working order.

L'adversaire acharné de la Société Générale, le grand David, to use the title conferred upon him by the Bulletin financier, appears now to be interesting himself (unless the notices which he appears to be responsible for are merely réclames or corps de journal articles paid for as advertisements) in mines "only 64 kilometres (40 miles) from the celebrated mines of the Comstock"—the Exchequer, I.X.L., and Isabelle—which have virtually ceased to be quoted on the English markets, and are, therefore, quite worthy in Mr. David's opinion of being recommended to French capitalists. The concerns were placed on the market under aristocratic and influential auspices in London, Exchequer and I.X.L. about seven years since, and Isabelle during last year, but the two first named have not been successful, have returned no dividends; and although the shares in them were once saleable at cent. per cent. premium, or even more, they have for some time past been dull at 90 to 95 per cent. discount. The Isabelle has been recently formed to permit of a conclusive opinion being formed; operations have been commenced at the mines apparently with promising prospects, but at the meeting of shareholders, on Feb. 26, the Chairman (Earl Poulett) is reported to have "congratulated the shareholders upon the result of their financial arrangements with the Patent Liquid Metallic Capuling, Paint, Gilding, and Silvering Company," which is so incomprehensible a commercial operation on the part of a mining company that Mr. David will, no doubt, be glad to direct his clients' attention to it, and at the same time to tell them that to pronounce mines valuable, because they are "only 40 miles (64 kilometres) from a district in which minerals are known to exist is much like informing them that because there is a large amount of traffic on the boulevards between the Madeleine and the Bastille therefore a tramway from the Arc de Triomphe to Neuilly must return large profits. There is an awkward non sequitur in each case. Without saying anything against the value of the properties he is now recommending, it must be obvious to everyone that if Mr. David is accustomed to argue upon this principle very little importance should be attached to his adverse criticisms of the Société Générale pour favoriser le développement du Commerce et de l'Industrie en France.

The market for Hydraulic or Gold Washing Companies' shares remains in about the same position as last reported. During the

ensuing week meetings of shareholders in Blue Tent Consolidated Hydraulic Gold Mines and in Fall Creek Lakes Water Company will be held. The Blue Tent accounts are especially favourable, the working profit earned during the year at the mines having been 6370*l*. 14*s*. 7*d*. whilst in the previous year there appears to have been a loss of 262*l*. 11*s*. 7*d*. which would show the result for 1878 to have been over 9000*l*. better than in the preceding year. The company had on Dec. 31 cash at bankers 231*l*. 19*s*. 7*d*. and sundry debtors 10*l*. 12*s*. 10*d*. = 232*l*. 12*s*. 6*d*. and the other side of the account shows that the company owes in America 15,251*l*. 10*s*. 7*d*. in England 717*l*. 16*s*. 8*d*. and on bills payable 450*l*. = 26,077*l*. 7*s*. 3*d*. The Fall Creek Lakes Water Company's report recommends a dividend of 5 per cent. per annum upon the amount paid up, but it will be for the shareholders to determine whether they will sanction it. The accounts are of a nature which makes it a little remarkable that the auditor (Mr. Alfred Good, of Good, Daubies, and Co., accountants, and apparently the secretary of the Camp Floyd Company) or any other professional should have certified them without comment. The profit and loss account is correctly credited with 858*l*. 0*s*. 7*d*. for water and lumber sales, that being no doubt the profit on those accounts. Against this there is charged 201*l*. 4*s*. 2*d*. for London management, directors, &c., and 65*l*. 6*s*. 6*d*. for interest and discount, leaving a balance of 591*l*. 10*s*. 11*d*.; but the balance sheet raises a grave doubt whether the 858*l*. 0*s*. 7*d*. are realised profits, or only estimated, for there appears to be a balance at the bank of 66*l*. 18*s*. 2*d*. in the hands of the secretary 2*s*. 6*d*. and debts due to company 214*l*. 4*s*. 7*d*. = 215*l*. 5*s*. 3*d*. which is all that is accruing available to meet the company's indebtedness of 2082*l*. 10*s*. 10*d*. in England, 1300*l*. 10*s*. 2*d*. in America, and 1042*l*. in bills payable = 4424*l*. 1*s*. The prospects of the Fall Creek Company are considered to be excellent; but it is remarked that only 6522 of the 10,000 shares are issued, and the payment of a dividend of less than 500*l*. whilst there is over 2200*l*. of indebtedness would so permanently weaken the financial position of the concern as to render the placing of the remaining shares almost impossible.

Blue Tent, 2 to 2½; the accounts, made up to Dec. 31, 1878, show that the actual profit made during the time that water could be had last year was 6370*l*. The company expect to obtain a much longer supply of water this season, as the lakes of the Fall Creek Company will provide a considerable stream. The report of the manager, an epitome of which will be found in another column, is entirely satisfactory, and the prospects of the company are most cheering. Birdseye Creek, 14*s*.; the latest news from the property continues satisfactory. Water was abundant, and steady washing in progress. Owing to the non-completion of the powder drifts in Neece and West claim the washing there during the first part of April would be on top dirt only. Placerville, 2½ to 2¾; at the date of the last advices the main shaft had been sunk to a depth of 489 ft. The winze had also been sunk deep enough to communicate with the 400 ft. level, and the end was rapidly approaching the same. The quartz continues of about the same value.

Hulafall, 2 to 2½; advices from the mines state that dressing operations have been commenced under favourable auspices, and the mines are reported as returning large quantities of ore to keep the dressing mills in full work. Lead mine shares have not been much in request, but a fair amount of business has been done in several of them, at prices fully equal to those obtained last week. Van, 18 to 20; the usual monthly report appears in another column. The sale on Thursday, 400 tons of lead and 150 tons of blende, realised 4128*l*. 15*s*. Frongoch, 2½ to 2¾; a parcel of 120 tons of lead ore has been sampled, for sale on Wednesday. This parcel of ore assays up to 81 per cent. of lead, but contains a small proportion of silver, and, therefore, should realise a good price. This is the first sale of ore by the new company, and, considering that so short a time has elapsed since taking possession, is a satisfactory beginning, and will doubtless, it is said, be followed up by steadily increasing returns. The company have only been in possession of the mine a little over six months, and have during that time sunk the new perpendicular shaft, and converted the whole of the machinery so as to be worked entirely by water power, instead of by steam, as formerly, thereby preventing a large outlay for coals and skilled labour, which would go far towards yielding a fair return upon the moderate capital of the undertaking. It is mentioned that this mine produced lead in large quantities for upwards of 35 consecutive years, during which period large sales were made, the total up to June last being no less than 4,110 tons, which realised the large sum of more than 530,000*l*. or an average price of 12*l*. 12*s*. per ton. The principal levels of the mine, as described in the manager's latest report, published in last week's Journal, all yield an abundance of ore, the lode being valued at from 3 to 5 tons per fathom.

Grogwinion, 2½ to 3; the mine is looking well, and still improving in the deep levels. Wye Valley, 1½ to 1¾; 40 tons of lead have been sampled for sale on Friday next. The mine is opening out well. West Wye Valley, 1½ to 1¾; no fresh news of importance. Red Rock, 1½ to 2½; good progress making here. Caron, 1½ to 2½; the 30 tons of lead sold last week fetched 8*l*. 5*s*. per ton. Capital accounts still coming to hand. The new level at the 22 is begun, and will soon be under the rich ore ground discovered in sinking the winze from the 10. Prospects very good. Mawton, 1½ to 2; Hartington Moor, 1½ to 2.

Mineral Corporation, 10 to 11; operations are progressing much as usual. The lode in No. 3 adit end has a good mixture of lead; No. 2 rise in the back of this adit has been set out. They are leaving the main part of the lode standing to the north till the rise is communicated with No. 2 adit, when they will be able to put 20 men to stop on good paying ground. Surface work is progressing satisfactorily. Some of the drill machinery has arrived.

British Silver-lead, 2½ to 3; the agent writes: "We have now opened 12 fms. on the course of ore in the 10 yard level, west of shaft, which continues rich, and likely to be so for at least 300 fms., there being trial pits at that distance with good ore in them. I think we have sufficiently proved the vein to warrant the erection of crushing machinery, &c. We shall then be in a position to sell silver-lead ore and rich blende monthly."

At Pateley Bridge very good progress is being made in the erection of the new machinery. The end driving on the Wake and Fielding's veins are looking exceedingly well. Other parts unchanged.

Cwm Brwyno, 2 to 2½; the rich discovery on Powell's lode maintains its value. Subjoined are the closing quotations:—

Ashton, ¼ to ¾; Carn Brea, 25 to 30; Devon Consols, 1½ to 2½; Dolcoath, 27 to 29; East Caradon, ¼ to ¾; East Van, 1¼ to 1½; East Pool, 10 to 10½; Gwernymynydd, 4 to 4½; Great Laxey, 15 to 15½; Hingston Down, ¼ to ¾; Leadhills, 1½ to 2½; Marke Valley, ¼ to ¾; Parys Mountain, ¼ to ¾; Penstruthal, 1½ to 1¾; Roman Gravel, 8½ to 9; South Condurow, 12 to 12½; South Frampton, 2½ to 3; Tankerville, 3½ to 3¾; Tincor, 10 to 11; Van, 18 to 19; West Ashton, ¼ to 1; West Basset, 4½ to 5; West Chilivert, 2½ to 2¾; Wheal Pevor, 9 to 9½; Wheal Grenville, 3 to 4; Almaden and Tinto, 3½ to 4; Blue Tent, 1½ to 2; Canada Gold, 2 to 2½; Cape Copper, 27 to 29; Chontales, ¼ to ¾; Colorado, 1½ to 2½; Don Pedro, 14*s*. to 15*s*.; Eberhardt, 4 to 4½; Exchequer 3-16ths to 5-16ths; Flagstaff, ¼ to ¾; Frontino and Bolivia, 2 to 2½; Hulafall, 2 to 2½; Javali, 4*s*. to 6*s*.; Kapanga, 7-16ths to 9-16ths; Last Chance, 2½ to 3; New Quebrada, 1½ to 2; Petakera, 1-16ths to 3-16ths; Placerville, 2½ to 3; Pumas Eureka, 2½ to 3; Port Phillip, ¼ to ¾; Richmond Consolidated, 1½ to 2; John del Rey, 25 to 27; Sierra Buttes, 1½ to 2½; South Aurora, ¼ to ¾; United Mexican, 4 to 4½.

At Redruth Ticketing, on Thursday, 1444 tons of copper ore were sold, realising 4827*l*. 6*s*. The particulars of the sale were—Average standard, 84*l*. 10*s*.; average produce, 7½; average price per ton, 3*l*. 7*s*.; quantity of fine copper, 104 tons 2 cwt. The following are the particulars:—

Date. Tons. Standard. Produce. Per ton. Per unit. Ore copper. April 3 1140 84 8 0 7½ 23 11 0 9*s*. 6*d*. 247 11 0 17 2535 90 7 0 6½ 2 17 0 9 5 46 2 0 May 1 1444 84 10 0 7½ 2 17 0 9 5 46 2 0

Compared with the last sale, the decline has been in the standard 1*l*. 10*s*. and in the price per ton of ore about 2*s*.

SOUTH CROFTY.—At the meeting held on Friday, the accounts, which have been already published, were passed. Capt. Thomas stated that everything was brought up close, and the merchants' bills charged to the end of March. The agents reported: "We have since drained the mine to the bottom, and have already driven the cross-cut upwards of 5 fms. north towards the part which is believed to be standing to the north of our present working, and on which part they are driving west in East Pool Mine at the 170 fm. level, where they have a very productive lode. We expect to drive our cross-cut at the rate of about 6 fms. per month. The 170 west in East Pool, being upwards of 100 fms. from our workings, we cannot say with any degree of certainty how many fathoms we may have to drive to intersect the lode, but it is not likely to be far distant, and a good lode may be intersected at any time. We have not been doing anything in any other part of the mine since the special meeting with the exception of working three pitches on tribute."

LAXEY UNITED.—This company is proposed to be formed in 30,000 shares of 1*l*. each to purchase and work North Laxey and adjoining Glencherry Mines, both of which are on the Great Laxey lodes. North Laxey has already yielded lead to the value of at least 25,000*l*. and Glencherry has also yielded some good ore, although as yet comparatively shallow. Capt. H. W. Rowe (one of the present managers of Great Laxey) states that he has a very high opinion at Glencherry Mine if it is sunk deeper. Capt. Kitto (manager of Grogwinion Mine) says that he has known Glencherry sett, for many years, and has always looked upon it as one of the best pieces of ground in the Isle of Man, and he has no doubt that proper working would be attended with the best possible results. Capt. Plummer (an agent much employed by Messrs. John Taylor and Sons) says that the situation of the mine is exceedingly good, that the lode is of good width and has a fine appearance, and is altogether such a one as should be expected to be found rich as depth is gained. He adds that it affords him pleasure to bear testimony to its intrinsic merits. The advantages of an amalgamation of these two mines are—that the two sets under one company will, in one or other of the mines, secure the Great Laxey lodes where they leave the northern boundary of the company's property, and thus greatly increase the chances of success. In addition, the machinery at North Laxey is ample, and would be available for both mines, and one set of agency would be sufficient for the management of the two sets. The 1*l*. per share is payable by easy instal-

ments, and for each share paid upon a bonus share is given, making the average price only 10*s*. per fully paid share of 1*l*. Shareholders may be reminded that Tuesday next, the 6th inst., is the last day for receiving applications.

NORTH WALES SLATE TRADE.—The slate trade, the chief industry of North Wales, is passing through the dulllest period which has been experienced for many years and no sign of improvement is perceptible. At the majority of the Carnarvonshire and Merionethshire workings the days of labour are still limited to three weekly. At the extensive quarries of Lord Penrhyn and Mr. Assheton Smith, in the Bethesda and Llanberis districts, the large staff of workmen usually employed has been reduced to a minimum, and work four days a week at a lowered rate of wages, while many of the smaller quarries have entirely suspended operations. The shipping ports of Carnarvon, Bangor, and Portmadoc are suffering seriously from the long-continued depression. Large numbers of the quarrymen are availing themselves of the pecuniary grants voted by the North Wales Quarrymen's Union towards emigration, and Mr. W. T. Parry, the president and founder of the organisation, is now in the United States with the object of facilitating the dispatch of the unemployed unionists to fields of labour.

BLAEN CARLAN UNITED.—A great improvement has taken place in the lode in driving at the 30 fm. level to communicate with the winze, the lode now being worth 2 tons to the fathom so far as seen, and there is yet more of the lode to strip down.

GELATINOUS NITROGLYCERINE.—Some interesting experiments have recently been made at the Zankly Arsenal by the Austrian artillery staff on a material said to possess far greater explosive power than any substance hitherto discovered. It appears that Mr. Nobel found that the latter could be prepared in such a way that it could be completely dissolved into nitroglycerine. The product is a gelatinous and gummy substance, which at the highest pressure does not part with any of the nitroglycerine. That explosive gelatine resists water, cannot be fired by any shock, but only goes off with difficulty and imperfectly when ignited. Further experiments showed, however, that with it a new compound could be formed, admirably adapted to all military purposes. This is prepared by simply adding a little camphor to the gelatine. The proportions are 4 per cent. of the former to 96 per cent. of the latter, which consist of 90 per cent. of nitroglycerine and 10 per cent. of fulminic cotton. The gelatinous mass is elastic, transparent, of a pale yellow colour, and can be cut with a knife. When set on fire in the open air it burns like dynamite or dried compressed gun cotton. It only takes fire at a very high temperature, and the action of the camphor is very evident in that respect, for the ordinary gelatine by itself explodes at 200° Centigrade (392° Fahrenheit), while the heat required to produce that effect after the addition of the camphor cannot be tested by any of the apparatus usually applied to that purpose. The new composition cannot be fired by a blow even from a projectile; it shows no sign of alteration even after having been left in running water for 48 hours. When solidified by cold it forms a mass resembling sugar-candy, and is then more sensitive to mechanical action, but as soon as it is thawed it resumes all its original properties. When exploded, however, it produces less smoke than dynamite or gun cotton, with a clearer and more sonorous report, and has far greater force than either. The principal objection to its adoption was the difficulty in igniting it, but that has been overcome. When cotton fibre is subjected to the action of sulphuric acid a white pulverulent substance is obtained, which has received the name of hydro-cellulose, is easily soluble in nitric acid, when it becomes nitro-hydrocellulose. This compound, mixed in the proportion of 40 per cent. with 60 per cent. of nitroglycerine, forms the most powerful means of ignition ever hitherto discovered. By the properly constructed firing cartridges of that substance the explosive gelatine becomes as manageable as ordinary powder, with less danger and far greater expansive force.

COLLIERY MANAGER WANTED.

IN CONSEQUENCE OF THE DEATH OF MR. JAMES DAVIDSON (for many years Manager of the Newbottle Colliery, and latterly also of the Dalkeith Colliery), the SITUATION OF MANAGER of these COLLIERIES is NOW VACANT. Particulars will be given by Messrs. TODD, MURRAY, and JAMIESON, W.S., 66, Queen-street, Edinburgh, with whom applications containing full information, accompanied by testimonials, must be lodged on or before 16th May next.

TO BROKERS AND OTHERS.

WANTED, A BROKER, to assist in FLOATING SHARES of a GOLD AND SILVER MINING COMPANY, which is on the point of being registered. The properties are very rich, and worth attention. Address, "Owner," care of Hart and Co., 10, Bush-lane, London, E.C.

TO BROKERS AND OTHERS.

WANTED, TO ISSUE, £3750 WORTH OF £1 SHARES, out of 10,000, for which £150 will be allowed in cash. Particulars and reports, and every information, by applying to "F. R. A. E.," Goggin, N. S. O., Cardigan-shire.

WANTED, BY ADVERTISER, whose articles have expired, a SITUATION—CIVIL or MINERAL ENGINEER and SURVEYOR, at home or abroad (the latter preferred). Good references. Salary not so much an object as opportunity of obtaining further practical experience. Address, J. BANKS, Talgwynedd, near Dwyran, Anglesea, R.S.O.

ROMAN GRAVELS MINING COMPANY (LIMITED).

Notice is hereby given, that the Directors have this day DECLARED A DIVIDEND OF THREE THOUSAND POUNDS (free of income tax), being FIVE SHILLINGS per share on the 12,000 shares of the company, PAYABLE on and after the 20th proximo to the shareholders on the books of the company on the 8th proximo.

The Transfer Books will be closed from the said 8th to the 20th proximo, both days inclusive. By Order, F. F. WILSON, Secretary. 30, Finsbury-circus, London, E.C., April 29th, 1879.

NOUVELLE MONTAGNE COMPANY.

THE DIVIDEND for the YEAR 1878 will be PAYABLE:—1.—On the 30th June next, FIFTY FRANCS per WHOLE SHARE, Coupon No. 28, and TEN FRANCS per FIFTH of SHARE, Coupon No. 45. 2.—On the 31st December next, SEVENTY FRANCS per WHOLE SHARE, Coupon No. 29, and FOURTEEN FRANCS per FIFTH of SHARE, Coupon No. 45.

The coupons for encashment to be presented to Messrs. E. DEVAUX and Co., 62, King William-street, E.C., London.

Le Directeur Général de la Société, V. BOUHY. Engis, le 25 April, 1879.

THE BLUE TENT CONSOLIDATED HYDRAULIC GOLD MINES OF CALIFORNIA (LIMITED).

Notice is hereby given, that the ANNUAL GENERAL MEETING of the Shareholders in this company will be HELD at the offices, as below, on TUESDAY, the 6th day of May, at One o'clock in the afternoon, precisely, for the purpose of receiving the report of the directors and statement of accounts for the year ending Dec. 31, 1878, the election of directors and auditor, and for transacting the ordinary business of the company.

The Transfer Books will be closed from May 1st to the 6th, both days inclusive. By Order, W. J. LAVINGTON, Secretary. 14*a*, Austinfriars, London, E.C., April 28th, 1879.

THE FALL CREEK LAKES WATER COMPANY (LIMITED).

Notice is hereby given, that the ANNUAL GENERAL MEETING of the Shareholders in this company will be HELD at the offices, as below, on TUESDAY, the 6th day of May, at One o'clock in the afternoon, precisely, for the purpose of receiving the report of the directors and statement of accounts for the year ending December 31st, 1878, the election of directors, and for transacting the ordinary business of the company.

The Transfer Books will be closed from May 1st to the 6th, both days inclusive. By Order, W. J. LAVINGTON, Secretary. 14*a*, Austinfriars, London, E.C., April 28th, 1879.

RIO TINTO COMPANY (LIMITED).

Notice is hereby given, that the SIXTH ORDINARY GENERAL MEETING of the Shareholders will be HELD at the Cannon street Hotel, London, E.C., on FRIDAY, the 9th day of May, 1879, at Two o'clock precisely, for the purpose of receiving the directors' report and statement of accounts.

Holders of Share Warrants to bearer will receive a ticket of admission on depositing their warrants at the company's offices, in London, not later than Twelve noon on the day of the meeting, or at the Deutsche National Bank, in Bremen, two days previously.

The retiring directors are Henry Doetsch, Esq., and Ludwig Gottfried Dyes, Esq., who, being eligible for re-election, offer themselves accordingly. The retiring auditors are Messrs. Tarquand, Youngs, and Co., who, being eligible for re-election, offer themselves accordingly.

By order of the Board, E. J. FENNESSY, Secretary. Offices of the Company, 2, Copthall Buildings, London, E.C., 2nd May, 1879.

CAPPER PASS AND SON, BRISTOL

PURCHASERS OF
LEAD ASHES, LEAD SLAGS, SULPHATE OF LEAD, HARD LEAD, BRASS SLAGS AND ASHES, COPPER REGULAR, MATTE, SCORIA, TIN ASHES, TERNE ASHES, &c., and MIXED ORES or REFUSE, containing LEAD, COPPER, TIN, or ANTIMONY.

GEO. G. BLACKWELL,
5, CHAPEL STREET, LIVERPOOL,
PURCHASERS OF
MANGANESE, ARSENIC FLUOR-SPAR, WOLFRAM, BLENDE, CALAMINE, CARBONATE and SULPHATE OF BARYTES, ANTIMONY ORE, CHROME ORE, MAGNESITE, EMERY STONE, PUMICE STONE, OCHRES and UMBERS, CHINA CLAY, LEAD ORE for POTTERS TALC, PHOSPHATE OF LIME, &c.

AUSTRALIAN TIN—PRIZE MEDAL, 1877.

THE UNDERSIGNED IS PREPARED to EXECUTE ORDERS for the CELEBRATED

"KANGAROO" BRAND.
S. L. BENSUSAN.
Kangaroo Tin Works, Sydney, December, 1878.

HENRY WIGGIN AND CO.
(LATE EVANS AND ASKIN),
NICKEL AND COBALT REFINERS
BIRMINGHAM.

T. V. CLARKE AND CO.,
TRUNDLEY LANE, SURREY CANAL,
DEPTFORD, S.E.

ARE BUYERS OF
CALAMINE and BLENDE; ZINC and LEAD ASHES, SULPHATE OF LEAD, and OTHER METAL RESIDUES.

N.B.—Sole Manufacturers of the Palm Anti Friction Grease and Lubricating Oils for Collieries, Mines, &c.; also the Asphaltic Varnish Paint for coating outdoor Ironwork and Machinery.

ENOCH AND RICHARD PARRY.
MINING AGENTS AND SURVEYORS,
MINSTERLEY, SHROPSHIRE.
Mines inspected and reported on at home and abroad.

THE ADVERTISER, aged 27, requires RE-ENGAGEMENT as CLERK and SURVEYOR to MINES. Large experience. Good reference. No objection to go abroad. Apply to "Y," MINING JOURNAL Office, 26, Fleet street, E.C.

PUMPING ENGINE WANTED.—A SECOND-HAND DIRECT-ACTING CONDENSING ENGINE, about 60 inch cylinder, or the same size CORNISH BEAM ENGINE; also 45 fathoms 20 inch FORCE PUMP and RODS complete, together or separately. Must be in first class condition. State price delivered into railway trucks. Address, Messrs. THICKS, SONS, and Co., City Chambers, Nicholas-street, Bristol.

WANTED, for the IRON and TIN-PLATE TRADE, a FIRST-CLASS TRAVELLER. Address, giving full particulars of qualifications, ground covered, and salary expected, "M. 64," care of Henry Greenwood, Advertising Agent, Liverpool.

WANTED, a SITUATION as LEAD DRESSER—COPPER OR BLENDE. Lead preferred. Thirty years' experience; greatest part of the time in mixed minerals. Have had charge of dressing floors for the last twenty years. Age forty. No objections to going abroad. First-class references. Address, T. ELLERY, St. Teath, Cornwall.

FOR SALE, TWO HUNDRED PRINCE PATRICK LEAD MINING SHARES. Price 2*s*. No offer for less than Fifty Shares entertained. Address, "O 70," care of Henry Greenwood, Advertising Agent, Liverpool.

SPANISH MINES.—Advertiser is in a position to OBTAIN SOME VALUABLE GOVERNMENT GRANTS, which will PAY HANDSOME PROFITS. Parties commanding as little as £100 or £200 may apply. Address, "Minas," Treviso, Province Santander, Spain.

J. S. MERRY,
ASSAYER AND ANALYTICAL CHEMIST,
SWANSEA.
SUPPLIES ASSAY OFFICE REQUIREMENTS AND RE-AGENTS.

R. B. HARPER,
MINING ENGINEER,
WHISPERING or EXAMINE and REPORT on MINES on the PACIFIC COAST. Having had 14 years' experience in Gold and Silver Mining in Mexico, California, and Nevada. Government Mining Engineer for the Province of British Columbia. Any communications may be addressed Room 49, Nevada Block, San Francisco, California.

LEAD ORES.
Date. Mines. Tons. Price per ton. Purchasers.
April 28—Herod-foot 38 £14 2 0 Panther Company.
— ditto 17 10 16 6 Walker, Druce, and Co.
— Caron 30 8 5 0 Walker, Parker, and Co.
May 1—Van 50 10 1 6 Adam Eytton.
— ditto 25 10 5 0 ditto
— ditto 50 9 17 6 Sheldon, Bush, and Co.
— ditto 100 10 2 6 Mining Co. of Ireland.
— ditto 10 10 0 0 ditto
— ditto 75 10 5 0 ditto
2—South Darren 45 14 6 6 Adam Eytton.

BLENDE.
Date. Mines. Tons. Price per ton. Purchasers.
May 1—Van 75 £1 15 0 Swansea Vale Co.
— ditto 25 1 15 0 Bagillt Company.
— ditto 50 1 17 6 ditto

COPPER ORES.

Sampled April 16, and sold at Tabb's Hotel, Redruth, May 1.

Mines.	Tons.	Price.	Mines.	Tons.	Price.
Mellanear	88	£2 10 6	West Tolgus	62	£4 4 0
ditto	85	2 4 6	ditto	51	5 18 6
ditto	84	3 2 0	ditto	50	3 7 6
ditto	77	2 16 6	West Seton	46	3 7 0
ditto	67	3 14 0	ditto	40	4 1 0
ditto	65	2 18 0	ditto	38	4 14 0
ditto	60	2 15 0	Botallack	65	4 10 0
ditto	45	3 13 6	ditto	50	4 16 0
ditto	38	8 8 0	South Crofty	30	2 12 0
East Pool	66	1 16 6	ditto	15	0 19 0
ditto	52	2 4 6	Pope's Ore	25	3 7 6
ditto	45	1 19 6	ditto	2	23 10 0
ditto	40	1 6 0	North Trekerby	26	2 6 0
ditto	39	1 6 0	Penstruthal	15	1 8 6
ditto	25	0 15 0	Williams's Precipitate	1	13 10 0
West Tolgus	63	6 3 0			

TOTAL PRODUCE.
Mellanear 610 £1970 19 0
East Pool 267 448 9 6
West Tolgus 226 1118 15 6
West Seton 122 485 6 0
Botallack 105 457 10 0
Average standard £ 34 10 0 | Average produce £ 23 7 0
Quantity of ore 1444 | Quantity of fine copper 104 tons 2 cwt.
Amount of money £4827 6 0
LAST SALE.—Average standard £ 30 7 0 | Average produce 6½
Standard of corresponding sale last month, £ 34 8 0.—Produce, 7½

COMPANIES BY WHOM THE ORES WERE PURCHASED.
Names. Tons. Amount.
Vivian and Sons 387 £1375 8 0
Grenfell and Sons 106½ 564 6 6
Newill, Druce, and Co. 375 1191 17 6
Williams, Foster, and Co. 377½ 1258 16 0
Mason and Elkington 135½ 438 18 0
Total 1444 £4827 6 0

NO SALE on Thursday next, May 8, or Thursday week, May 15.

Notices to Correspondents.

* Much inconvenience having arisen in consequence of several of the Numbers during the past year being out of print, we recommend that the Journal should be filed on receipt; it then forms an accumulating useful work of reference.

MINING JOURNAL.—Bound volumes wanted of the Journal for the years 1870, 1871, 1872, and 1876. Any subscriber having them to dispose of will oblige by stating price. Address, "E. C. O.," Mining Journal Office, 28, Fleet-street.

WHEAL WREY, LUDCOTT, AND NORTH TRELAUNE.—I think "A. W. B." may take it that the above concern was finally dissolved by Stannaries Court Liquidators' Order of June 25, 1878, but I will not pledge myself. I wonder what the legitimate expenses were; I suppose it will never be known.—A LONDON SHAREHOLDER.

SIR.—A pig of lead, branded "T. M.," has recently been found in the bed of the River Dovey, near Glandovey, Wales. Can any of your readers say what names the initials represent?—PLUMBUM.

Received.—"C. H." (St. Kitts).—"H. M. L." (Sheffield).—"W. T. S."—"Shareholder" (Colorado United).—"Amateur" (Leek).—"Constant Reader" (Rickmansworth).—"E. Y."—"C. E."—"J. N."—"Turf" (Dartmoor).—"A. O." The remarks of "Observer" on Mr. Peter Gifford are not adapted for publication.—"E. J. B." (Chepstow) can obtain the information at any local booksellers—"Shareholder" (Glasgow Caradon).

THE MINING JOURNAL.

Railway and Commercial Gazette.

LONDON, MAY 3, 1879.

COAL GAS, AND ITS USES.

The many uses to which ordinary coal gas is now put must have been as far beyond those dreamt of by the discoverers as the recent scene on the part of the gas companies with respect to the electric light. Whatever ultimately may be the result of the investigations now being made in connection with electricity as the great illuminating power of the future, there cannot be a doubt but what coal gas will be an actual necessity, so that we quite agree with Professor TYNDALL in the evidence he gave before the Select Committee appointed to enquire into "Lighting by Electricity," to the effect that he did not believe gas would be beaten out of the field by the electric light, as there was too much use for it. That this is actually the case even at the present time is happily illustrated just now at Leeds Town Hall, where there is a most interesting exhibition of gas appliances. Probably, in no place could such an exhibition be so well treated, or gas for the purpose so economically used, for it is supplied to the inhabitants of the town at 2s. 6d. per thousand feet—a price said to be lower than in any other part of the kingdom. The exhibits include almost everything in which gas plays a part, and some of them are worth more than a mere passing notice, seeing that they may be looked upon as important fuel economisers, and likely to come into more general use than they are at present. Cooking by gas is admitted to be superior and more effectual, besides being much cheaper, than with coal, whilst gas engines are making considerable headway, more especially where only a moderate amount of power is required, and can be supplied at less cost than steam. There are kitcheners or cooking stoves in varied forms, some of them being capable of preparing a dinner for a dozen persons at a cost of from 2d. to 3d. One of these cooked a leg of mutton weighing nearly 9 lbs. with 37 ft. of gas. Messrs. LEONI and Co., of London, show their "Nonpareil" Family Gas Kitchen, which, besides boiling, stewing, and frying, roast and bake to perfection with a small expenditure of gas, the necessary temperature being easily obtained with a consumption of 20 cubic feet of gas per hour. The same firm have an "anti-an's cooker" that will grill up to nearly 2 lbs. of steak, steam 2 lbs. or more of potatoes, boil greens, steam a pudding, supply two quarts of water for washing up, and one quart of water for tea in 75 minutes, at a cost of about 1d. Messrs. GALLI and Co., of Leeds, show some strong and durable cooking stoves having a terra-cotta glazed lining, which greatly assists in the retention of the heat. Another interesting exhibit is that of Messrs. WRIGHT and Co., of Birmingham. By it the joint to be roasted is placed in the lower compartment, and the gas above it. The oven is heated by the waste heat passing round it in flues constructed for the purpose, so there is no gas inside the oven. In the collection of Messrs. HASSELL and SINGLETON, also of Birmingham, there is a cooking stove lined with MINTON'S white tiles for roasting, baking, grilling, &c., with meat pan, stand, and loose portable wrought-iron baking oven, with a large flat-topped tin boiler and cock. The boiler heats in conjunction with or separate from the stove. Mr. WILLIAMSON, of London, shows his "Chef" stove, which has a cast-iron front with drop-down door, the roaster being the length of the stove, and the burners are so arranged that for roasting small joints half of them can be turned off. He has also a handy contrivance—a "workman's cooker," that will roast a joint of 6 lbs. and boil 2 lbs. of vegetables at the same time, the heat being reflected on the meat. When not used for cooking the stove can be at once converted into a heating stove by placing a copper reflector underneath the gas jets. That cooking by gas, more especially during the summer months, is a desideratum few will deny, whilst there are the still greater advantages of cleanliness and economy, whilst there is no foundation for the belief that gas flavours the meat.

The gas-engines show advantageously what a large amount of power can be obtained at a comparatively trifling cost, and without any loss after the work required is completed. Messrs. CROSSLEY Brothers, of Manchester, show two of these engines, a 1-horse and a 3-horse power, the former driving a blow-pipe and doing its work admirably, whilst there is also a BISCHOFF gas-engine belonging to a Stockport firm. For the melting of metals it appears that gas can be also advantageously used, for Mr. FLETCHER, of Warrington, has some small furnaces in which gold, copper, and silver can be melted in a marvellously short space of time. Then there is a cabinet Turkish bath, and gas-lighting apparatus of three different kinds—one by TWIGG'S arrangement, of lighting by percussion taper; HOFFMAN'S mode, which is managed by a lever and small pilot jet; and then there is the electric system. Another ingenious application of gas is MAUGHAM'S water-heating apparatus, by which water being put into the receiver quite cold can be drawn out immediately at a temperature of 140°.

Gas-burners are of great importance to nearly all persons, for by them gas can be wasted or economised, and in the Leeds Exhibition there is a great variety, and no doubt many of them are far superior to those in general use, brilliancy and economy, of course, being the leading features. Messrs. BRAY, Leeds, have a show of standard patent slit union burners, and it is claimed for them that the yield of light is from 12 to 20 per cent. greater per cubic foot of gas consumed than that from any flat flame burner hitherto introduced. All the burners are tipped with enamel. Mr. SUGG, of London, also shows several of his well known burners that are admitted economisers. From Oldham Messrs. STOTT and Co. show at work their patent gas regulators, being specially designed for the protection of the consumer. It is claimed for them that if attached to any meter or service-pipe a great saving will be effected, and a uniform pressure of gas maintained. W. F. TOMLINSON and SON, Leeds, exhibit a self-acting gas-burner, worked on the lever principle, and a self-acting gas regulator. For the latter, as in the case of Messrs. STOTT, it is claimed that when attached to a gas meter it regulates the supply of gas according to the number of lights required, without in any way diminishing the light itself. When no gas is wanted for use the outlet is closed by the action of the regulator preventing the gas from entering the pipes, and thus a large amount of waste and loss arising from condensation and leakage is avoided. The products of gas tar are shown by Messrs. STANBY and LYON, of Knottingley, in the shape of the beautiful aniline and alizarine dyes, with all the intermediate material, with specimens of dyed damask, yarn, wool, silk, paper, leather, jute, &c., showing that the colour can be deposited upon almost any description of material.

The interest taken in the gas-burners has been great, as all persons are desirous of economising as much as possible, and on one

evening an interesting competition took place in the front of the Town Hall between SUGG'S and BRAY'S burners. The two end lamps were fitted with SUGG'S Argand burners, each being an illuminating power equal to 200 candles, and to the other two lamps were affixed the 8-candle Argand burners, covered with his patent shades. On the other hand, two of BRAY'S flat-flame burners, giving a combined light equal to about 80 candles, were attached to each of the other two lamps, which were also fitted with BRAY'S patent shades. The light from the Argand burner was very brilliant, but was considered to be not so well diffused as the light from BRAY'S burners, which had the advantage of being adapted for lighting by the ordinary street lamp lighting rods, and of having no chimneys attached to them.

The exhibition has been promoted by the Gas Committee of the Corporation of Leeds, and who also provided the necessary gas required for setting the machinery, &c., in operation. The Corporation, it may be said, have been in no way alarmed at the prospect of electricity superseding gas, for whilst from the former they only obtained the illuminating power, from the latter they obtained several valuable products—and in Leeds last year the coke, ammoniacal water, and tar realised 37,000l., and this year it is estimated that they would yield 47,000l. This undoubtedly is a great advantage in favour of coal gas, the consumption of which, not only for ordinary lighting purposes, but for many other as well, will go on increasing until electricity can be produced and arranged very different indeed to what it can be at present.

GAS IN PARIS.

In consequence of the influences associated with the Universal Exhibition at Paris, that highly progressive undertaking, the Parisian Company for Lighting and Heating by Gas, made a still further advance last year, and a very large advance into the bargain. The political history of Paris is reflected rather curiously in its gas consumption. The Second Empire was, at any rate, a period of material prosperity until the fatal moment in 1870, when NAPOLEON III. and M. EMILE OLLIVIER went to war with a light heart; and accordingly we find that the consumption of gas in Paris experienced a rapid progress year by year—a progress which was not only rapid but also unchecked. In 1855 the consumption of gas made by the company under notice stood at 40,774,400 cubic metres, in 1860 at 75,518,922 cubic metres, and in 1865 at 116,171,727 cubic metres. In 1869 there was a further advance to 145,199,424 cubic metres. In 1870, however, came the terrible Franco-German war, and the encircling of the French capital by the armed hosts of Germany. The result was that in 1870 the Parisian Company for Lighting and Heating by Gas only sold 114,476,909 cubic metres of gas in that year. In 1871 the siege of Paris, and the Communist revolt which followed it, still further affected the business of the company, and its sales declined in that year to 87,481,346 cubic metres. But in 1872 there was a rapid recovery, and ever since that year the business of the company has been developing itself with remarkable rapidity. In 1875 its sales had grown to 175,938,244 cubic metres. In 1876 they had further expanded to 189,209,789 cubic metres and in 1877 to 191,197,228 cubic metres. Last year there was a still further advance to 211,919,517 cubic metres.

It is rather curious to observe that the day consumption figured in last year's total for 48,677,603 cubic metres. These figures were 6,203,987 cubic metres in excess of the corresponding total for 1877. This consumption, which arises exclusively out of the use of gas for industrial and domestic purposes, has made great progress of late years. Thus since 1875 it has increased to the extent of nearly 50 per cent. The company's receipts for gas, which amounted in 1877 to 1,928,232l., rose in 1878 to 2,161,039l. The number of public lamps served by the company last year was 45,004, showing an increase of 2306, as compared with 1877. The productive power of the company's works, which stood in 1877 at 228,500,000 cubic metres, was carried last year to 236,500,000 cubic metres. The company's system of pipes was increased last year to 796½ miles, a length very nearly representing the distance from Paris to Lisbon.

The Universal Exhibition of 1878 afforded the company an opportunity of illustrating the successive improvements introduced into its plant and into its processes of manufacture. A special pavilion was constructed for this purpose in the Champ de Mars, near the Porte de Seine. This pavilion comprised in a relatively limited space a very complete collection of all the models, specimens, and products associated with the company's industry. Thus drawings and plans were exhibited showing at a glance the manufacture of gas for lighting purposes, as well as the treatment of various sub-products, and the distillation of coal, coke, gas tar, and ammoniacal liquor. There was further shown a collection of the numerous products which science has succeeded in extracting from gas tar, and from which industry has derived for the colouring of fabrics a series of materials of tones as rich as varied. The collection further comprised the company's improved gas furnaces, its special canalisation junctions, its coke warming-apparatus, its gas engines, and its refractory products. The pavilion attracted a good deal of attention on the part of the public, and the international jury recognised the value of the company's efforts by awarding it a grand prize—that is to say, the highest reward accorded to exhibitors. The company does a great deal of work, and realises its reward in a handsome profit. In 1874 its 10l. shares received 2l. 4s. per share; in 1875, 2l. 8s. per share; in 1876, 2l. 9s. 8d. per share; in 1877, 2l. 9s. 8d. per share; and in 1878, 2l. 12s. per share. It is not surprising with such dividends as these to find the company's shares standing at about 50l. each.

COLLIERY MANAGERS, AND THEIR DUTIES.

It will be recollected that towards the close of March last an explosion of gas took place at the Deep Drop Pit of the Victoria Colliery, Wakefield, by which 21 persons were killed. In noticing the sad occurrence we drew attention to the evidence given before the Coroner by the certificated manager, Mr. GREAVES, who stated that he received reports at his house daily from the deputies, and then gave them instructions as to what was to be done, whilst he only occasionally visited the colliery, and seldom went down unless for measuring purposes. In doing so he said he considered he was complying with the Act of Parliament. Mr. GREAVES held at least a second certificate for another colliery, which we supposed was conducted in the same way, for in neither instance could there be a bona fide management according to the ordinary interpretation of the 46th section of the Act of 1872, which provides that "every mine to which this Act applies shall be under the control and daily supervision of a manager." According to Mr. GREAVES'S reading of the clause supervision meant instructions given to deputies, and when that was done he had complied with the Act. This was certainly a most extraordinary statement for the manager of a mine to make, and were it a correct view of what was intended by the Legislature, then the appointment of such persons as managers was merely to invite laxity of management, resulting in loss of life.

Taking exception to the view entertained by Mr. GREAVES, and considering that "daily supervision" meant "personal supervision," we stated that in the interests of the working miners the HOME SECRETARY should be asked whether the reading of the 46th clause of the Mines Regulation Act by the certificated manager of the Victoria Colliery was a correct one. We are now informed that a question in the form indicated was put by Mr. MACDONALD to the HOME SECRETARY, who replied most emphatically that it was not, and that daily supervision did not mean written instructions. Any other answer to our thinking would have rendered that part of the Act relating to certificated managers in the highest degree absurd, and would entirely do away with the intention of those who framed the clause, and make the management of mines as unsatisfactory as it was before the passing of the Act. We do not believe that it was intended by those who devoted so much time to making the Act one that would ensure increased safety to all persons working in our mines that one man should be the certificated manager of several collieries, seeing that it would be impossible for him to daily supervise them. A large colliery requires the undivided daily attention of a manager who is responsible for all that takes place in connection

with the ventilation, &c., and he should not be allowed to delegate his duties to other and irresponsible agents.

Although there could really be no question as to the correct reading of the clause relating to the appointment of managers of mines, we are glad that the HOME SECRETARY has given his high authority in favour of common sense in the meaning to be applied to words that one would have thought were so plain that they could not be mistaken, more especially by a gentleman whose abilities are such as to cause him to receive certificates as manager of either two or three collieries. Some able men we know find in the management of one colliery that their powers are taxed to the utmost, but there are others who appear capable of bearing any burden. In future legislation no doubt we shall have it clearly and unmistakably laid down that one man shall only have the management of one colliery, and that most persons will think is sufficient, seeing that ordinary individuals are not endowed with ubiquity.

AMERICAN COAL TRADE STATISTICS.

The edition of Mr. Frederick E. Seward's Annual Review of the Coal Trade (the sixth) for the current year contains an unusually large amount of information, the author having availed himself of the valuable details brought together through the recent Paris Exhibition, and especially of those given by Mr. Pechar, of Bohemia. With regard to anthracite coal, Mr. Seward reports that it is found in an area of about 470 square miles in Luzerne, Carbon, Schuylkill, Northumberland, Dauphin, and Columbia counties, Pennsylvania, and he states that anthracite has been forwarded to market at a positive loss to those engaged during the past season. As the area in which this quality of coal is found in the United States is limited, and the rapid and wasteful absorption of this territory large, the question as to the life of the anthracite coal field is of importance. There can be no doubt, he says, that the ability to produce is much less than has been calculated by many persons—30,000,000 tons—and that before many years the anthracite will be sufficiently appreciated to command a better price than has ruled within a few years past. Many well-informed persons prophesy that before ten years shall have passed anthracite will be a luxury; the dependence as a source of steam supply will perforce be found in bituminous coal. It is only necessary to bear in mind that at least 20 per cent. of the amount brought to the surface is wasted at the breakers to find that the amount extracted in the coming ten years may equal that of the fifty that have passed since the coal was first marketed.

After giving the usual details as to the progress of coal mining in the several regions of the United States, there is an interesting table showing the coal output of the globe, which Mr. Seward remarks are from the best sources, and the figures may be taken as essentially correct:—

Countries.	Coal area, Square miles.	Tons—1877.
Great Britain	11,900	134,610,763
United States	192,000	49,130,584
Germany	1,770	48,296,367
France	2,086	16,889,201
Belgium	510	13,938,523
Austria	1,800	14,252,038
Russia	30,000	1,900,000
Spain	3,501	699,500
Portugal	—	20,000
Nova Scotia	18,000	757,496
Australia	24,840	1,444,171
India	2,004	4,000,000
Japan	5,000	500,000
Vancouver Island	390	190,640
China, Chili, New Zealand, &c.	—	4,000,000

Mr. Seward remarks that the Anglo-Saxon race appears to be emphatically the coal race, and he will venture to affirm that it is just because it is the coal race that the Anglo-Saxon race has achieved the greatest advance in material civilisation. The whole of the information is given in a very readable and attractive style, and is worthy of attentive study not only in the United States but in every coal producing country wherever it may be situated; the volume should certainly be found in every colliery office.

COLLIERY ACCIDENT IN AMERICA.—Seven colliers who were buried in a mine near Wilkes Barre, Pennsylvania, were rescued unharmed after 5½ days imprisonment. They subsisted on the flesh of an imprisoned mule. The rescuers worked steadily day and night, constructing a drift 1200 ft. long to extricate them.

AN ENGINEERING FEAT.—A clever feat of engineering was successfully completed at Easton, Pennsylvania, on April 10. It appears that owing to the immense weight, the iron shoes in which rest two of the spans of the long Lehigh Valley Railway Bridge lately sank about 1 in., throwing the bridge out of grade, and the depression showed signs of becoming more serious. An iron casting 12 ft. long, 3 ft. 3 in. wide, and 3 in. thick, weighing 7000 lb., was placed under the spans of the bridge in order to elevate them. The spans weighed 180 tons each, and hydraulic jacks were used. The spans were raised, the masonry re-dressed, the castings placed in position, and the spans lowered and secured again without the stoppage of a single train.

GUNPOWDER EXPLOSION.—The report of Major MAJENDIE, R.A., Chief Inspector of Explosives, upon an explosion of gunpowder which occurred on March 11 in the extracting house of the gunpowder factory at Dartford, belonging to Messrs. Pigou, Wilks, and Laurence, whereby a boy was severely burnt, a man sustained slight injury, and a horse was killed. The extracting house was not fitted as a "danger building" as it ought to have been, and for the neglect the company are responsible; and from 12 to 16 in. of the brick safeing under the quenching pan at which the explosion occurred had been by accident or carelessness removed, the flue was open, the cement had become corroded and defective to an extent which sufficed to admit of the ready passage of powder dust and fire. Moreover, there were evident marks of powder having been recently burnt in the interstices and openings of this defective joint. The accident is thus easily explained. Some of the powder dust from the sweepings became ignited in or at the defective joint by fire from the exposed flue, other powder dust lying about the pot, and possibly some which had been imperfectly drowned and was floating on the water were next ignited, and the ignition thus established communicated to the powder in, on, and about the quenching pan, the explosion of which ignited the three tubs of sweepings in the cart. It is also evident that the accident was entirely due to a disregard of the instructions, for which act of disobedience the Inspector considers both Bonnick and Martin are to blame. The larger share of blame must rest upon Bonnick, who, being in the position of a foreman, should not have acceded to the suggestion of a workman (Martin) to disobey what he admits he knew to be the regulations. Bonnick endeavours to shelter himself by the plea that he did not consider himself really responsible for the work; he regarded Martin, he says, as responsible, he being the man who generally did this work. But this plea will not avail in the face of the fact that Bonnick occupied the position of a foreman, and must have known perfectly well that he was not subject to orders from his subordinate, and that he was, in fact, the person in charge. Major Majendie considers that by thus transgressing orders, whether by deliberate intention or by a weak compliance with a suggestion of Martin's, Bonnick has shown himself to be unqualified for any position of trust and responsibility in a gunpowder factory. Martin is also in his judgment to blame, for he was in the habit of working in this house, he was familiar with the regulations, and he yet took upon himself to suggest to a man who was less familiar with the work than himself that on this occasion these regulations might be safely and properly disregarded. This accident affords another illustration of the absolute necessity of insisting upon the strictest discipline even in matters of the most minute observance in a gunpowder factory. If the men are to consider themselves at liberty to depart from the regulations at their discretion, still more if men in a position of trust and responsibility, like Bonnick, are to lend the sanction of their authority to such acts of dis-

obedience, it is inevitable that accidents should take place, and the integrity of the whole system of precautions becomes compromised.

Mr. BATEMAN, as president of the Institution of Civil Engineers, is to give a conversation on Monday, May 26, in that part of the South Kensington Museum which contains the engineering and naval models and machinery. Mr. Bateman has intimated that on this occasion the authorities at South Kensington have given permission for the reception of other suitable objects for exhibition on the evening in question.

THE NATIONAL BANK OF WALES (Limited).—The directors of this company met on Wednesday at Manchester, Mr. Francis R. Crawshaw in the chair. The list of applications for shares was carefully gone through, and the allotments were made. The board again met on Thursday, Mr. Crawshaw in the chair. It was resolved that the allotment and regret letters be forthwith issued and arrangements immediately made to open up branches. The directors and others interested in the bank were afterwards entertained at dinner by Mr. George Watts.

REPORT FROM CORNWALL.

May 1.—When Consols have more nearly reached par than they have done within the memory of the present generation is hardly the period one would select as that which was likely to see a large and active business in securities of a less assured character. The shares of several of our mines pay very much better than Consols, and those of many others, it is probable, will do so ere long; but still we cannot, if we would, altogether divest mining of the speculative element, which is there more prominent than in the majority of ordinary investment. To not a few this very feature of speculation operates as an additional attraction, but upon others it has just the reverse effect. All things considered, therefore, and regarding the turn matters have been taking in the money market of late, the mining share market, though by no means animated, has been quite as active as could reasonably be anticipated. For some days, moreover, it has seemed as if we were on the verge of better things. The prices paid for black tin have continued to rule above the standards so long and so persistently that the general opinion—and one held with considerable confidence—was that there would have been a further official rise some days since. That a substantial recognised advance is now imminent is the view entertained among authorities whose judgment is generally looked up to.

We do not attach any particular importance to the step taken by the smelters in reducing the nominal standards yesterday by 1s., nor do we regard it as in any way calculated to interfere with the general course of events. It is only one more proof among many that where the smelters were once ready to lead they are now content to follow, and only too apt to sympathise with the usual fluctuations of the London market. The upward course may be checked, but it is not stayed.

There are several indications of a revival in mining operations beyond the restarting of St. Just Amalgamated. A new sett, called Violet Seton, is being opened up on the well-known north lodes of the Seton setts as a private speculation. Bell Vein, Gwennap, has again been set to work, and in the Marazion district, where the relics of a vanished industry abound on every hand, a new copper lode has been cut which promises well. Given a fair price for produce, Cornwall has plenty of unexplored and undeveloped mineral ground to keep enterprise going for many years to come. We hear several new adventures talked about, but so far only in the steady business-like way which is calculated to inspire confidence and lead to success.

The dispute between Capt. Teague and the Beaumont Boring Machine Company has been before the arbitrators during the week, the general impression being that Capt. Teague is too good a man of business to have made a blunder, especially in relation to a subject to which he has given so much attention. A good deal of work is being done just now on the mines with which Capt. Teague is associated. At Carn Brea two new winding-engines put up under the superintendence of Capt. Teague, jun., are working admirably, effecting considerable economy. Wheal Kitty, too, is looking likely to return to its former status.

Dolcoath has started the Ullathorn drill in the 350 fm. level, the deepest point at which, if we mistake not, any boring apparatus has been definitely set to work in Cornwall. Another new skip-road is to be put in at once, and it is said that the effect of this will be to allow of the raising and dressing of 450 tons of black tin per quarter. As our mines get deeper the question of drawing the stuff assumes a graver importance, and it is very satisfactory to see the attention being paid to this point, and with such excellent results, at the mines which are under the direction of Capt. Josiah Thomas and Capt. Teague. Indeed, a marked improvement within the past few years is to be recognised almost in every part of the county, but it is to the deepest mines, where the pressure of necessity in this direction is most severe, that we naturally look for the lead.

Unfortunately in one sense, for on the doctrine of averages it would be otherwise if mining in the locality were more active, Dr. Foster does not find very much need for his repressive activities in Devon. At the recent Sifton petty sessions, however, Jacob Legassick, mineowner, of Tavistock, was fined 2s. and costs for breach of the Metaliferous Mines Act, by neglecting to securely fence three shafts and an adit at Rainsdown Mine, in the parish of Keely, the workings of which had for some time been discontinued. Mr. Chilcott, of Tavistock, prosecuted on behalf of Dr. Foster, who said he gave the defendant notice on Feb. 17 last of the dangerous state of the shafts, but the notice had not been complied with. He reported the matter to the Home Secretary, and was directed to bring these proceedings. Mr. Solomon Perry and Mr. George Perry, the tenants of the farm on which the mine is situated, corroborated Dr. Foster's statement as to the dangerous state of the shafts, to some of which there was no fence at all, whilst the others were not securely fenced.

West Basset must be added to the growing list of prospering mines; 18377 profit in three months is decidedly encouraging, and there is every reason to believe that a long career of prosperity is before it.

The recent (happily, non-fatal) explosion at the Kennal Vale Gunpowder Mills has directed attention to the state of the gunpowder trade in Cornwall, which, considering the number of new explosives that have been introduced into the market, has been singularly prosperous until very lately. The Kennal Vale Mills are the oldest in the county, dating back, we believe, over half-a-century. The East Cornwall Gunpowder Mills, near Liskeard, was started about thirty years since, and the St. Allen about 15 years. Cornwall has by no means absorbed their energies, but they done a large foreign trade, and have sent large quantities to the North of England. The three mills are capable of turning out 130 tons per month, and until very recently have been in full work. Indeed, wherever Cornish miners go Cornish gunpowder goes, for one or other of the companies have depôts in almost every mining district in the world. The gunpowder companies have been mining adventurers, too, of no mean order, for there is scarcely a mine but has the name of a gunpowder company among its shareholders.

The Miners' Association of Cornwall and Devon, flailing its work greatly impeded by a debt of 200l., which has been gradually accumulating, the council have determined to make a strong effort to pay this off by means of a bazaar and fête, to be held at Tehidy, by Mr. Basset's permission, in August. For some 20 years the Association has conducted classes in the mining centres of Cornwall, teaching the sciences especially useful in mining operations. At present there are 13 weekly classes. Many valuable papers on mining subjects have also been published. Just now, when great effort is needed to enable Cornish miners to compete with foreign producers, it is hoped that those who have the means will assist in getting rid of the debt.

Mr. Matthew Loam, of Liskeard, read an important paper upon "Boiler Explosions and its Causes," on Tuesday, before the members of the Cornwall Mining Institute, at Camborne. Mr. Loam was of

opinion that explosions were not so much due to the weakness of the boilers, but was due to an unknown force generated in the water under certain conditions that were always to be observed in cases of explosion. There was a long discussion on the subject, in the course of which Mr. Loam's theory was repudiated, and it was denied that a collapse was due to any explosive secret power. Opinions were expressed that the tubes in boilers should be strengthened so as to be equal to resist four or five times the working pressure.

West Basset Mine has not been in a more flourishing state, as regards the produce of tin, for many years than just now. At the three-monthly meeting, on Tuesday, the agents reported that the mine was looking very well, that the stopes were worth on an average full 11s. per fathom, and that during the past three months the returns had been fully maintained—indeed, had exceeded that of any previous quarter. The profit on the three months' working was over 1800l., and the heavy debt against the mine has been reduced from 18,113l. to 14,952l.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

May 1.—The event of the week has been the issuing of a new price list by Mr. Fisher Smith, the agent for the Earl of Dudley's collieries. This action has been taken in consequence of a reduction in Cannock Chase coal. His lordship's thick coal West of Dudley, of the qualities denominated seconds, lumps, steam, bright and steam screenings is dropped 1s. per ton, and the same reduction applies east of Dudley to coal of the sorts known as furnace, steam, and lumps. As to heathen coal, lumps and screenings show a similar alteration, as also do coal and lumps raised from the New Mine measures. There is a reduction of 6d. per ton in slack West of Dudley, but East of Dudley there is no alteration in slack. His lordship's best coal, whether of the Thick coal measures or of Heathen coal measures, is unchanged in price. The prices west of Dudley are now—Thick coal, best, 14s.; seconds, 8s.; lumps, 7s.; steam, 6s. 6d.; screenings (bright), 6s. 6d.; steam screenings, 6s.; engine slack (best) from Hinley Colliery, 4s.; ditto, ordinary, 3s. 6d. Heathen coal—large, 14s.; lumps, 7s.; screenings, 6s. 6d.; slack, 3s. 6d. The rates current before this list was issued had prevailed for a year and eight months. According to the agreement entered into in November, 1877, wages of Thick coal miners will now be lowered 3d. per day or sturt, and those of Thin coal miners 1½d. per day. This will leave Thick coal men's wages at 2s. 9d. per day, and the wages of Thin coal men at 2s. 1½d. per day. Pig-iron of the sorts produced in Lancashire and the North of England is hardly so strong as a week ago, neither are native pigs. The business of the week in finished iron has not been large.

The directors of the Hamstead Colliery Company (Limited) have just issued their fourth annual report. The document sets forth that since the last annual meeting very considerable progress has been made in the operation of sinking, and at the present time a depth has been obtained of 392 yards. Down as far as 330 yards there occurred no noteworthy variation in the strata penetrated. At about that depth, however, the workings passed through a measure containing numerous fossils, plants, and ferns, indicating an approach to what are known as the coal measures, and at 341 yards was found a bed of limestone, which is considered to be, without doubt, the Spirorbis limestone, as it is found to contain numerous specimens of the fossil Spirorbis carbonarius. At Sandwell this measure was found at a depth of about 122 yards. It will be remembered that in the directors' last report reference was made to the finding of a somewhat similar stratum in limestone, then supposed to be the Spirorbis, but which by the subsequent event is proved not to have been the case. The directors found it necessary during the year to increase their winding power, and they, therefore, purchased and erected a pair of new 33-in. horizontal engines. The outlay on sinkings, buildings, railway sidings, and the like up to the present time amounts to 39,276l. At the shareholders' meeting in Birmingham, on Wednesday, the Chairman said it was calculated that the company would have to sink a total depth of 637 yards before they came down to the Thick coal. That they hoped to reach before the next annual meeting. The directors had as much confidence in the concern as at the beginning, and had no doubt whatever that people who had recently been buying shares at a considerable discount would make an excellent profit upon the transaction. The report was adopted.

Trade in North Staffordshire does not show much alteration either as to iron or coal. Colliers' wages continue to have a downward tendency. This week the whole of the men in the Harecastle and Woodshuts Colliery Company's mines at Kidegrove have been reduced 7½ per cent.

REPORT FROM MONMOUTHSHIRE AND SOUTH WALES.

May 1.—The Dinas explosion enquiry continued to the end of last week, when it was again adjourned till June 4. The Coroner (Mr. Reece) was again assisted by Mr. Wheelhouse, Q.C. Among the witnesses called was Mr. Morgan Rowland, who said that for ten years he was manager of the Dinas Colliery, leaving in November, 1877. In a letter to Colonel Hunt he had said that "you had sufficient foresight that the explosion was coming, and was well aware of the cause." That referred to a conversation he had had with the Colonel. While he was manager he had wanted to dismiss Mr. John Chubb, who afterwards became manager, and he made charges against Chubb for allowing men to work where there was gas. The "foresight" that an explosion "was coming" referred to a period before witness left. The interior of the Dinas pit is said to be a complete wreck. No more bodies have been recovered. The Bedwellty pits explosion inquiry has terminated in a verdict that death was caused through accident. It is believed a sudden outburst of gas caused the disaster.

At the P. nypool Petty Sessions Mr. J. C. Hill, who, by the bye, is a county magistrate, has been fined 6s. for allowing six females to work after hours. Mr. Hill stated that there was a contract in hand for tin-plates, which must be delivered by a certain day, and the girls were put on a few extra hours, and he said, besides, "I submit to you that this Factory Act is an abomination in the land. The Mines' Regulation Act has added 1s. 6d. per ton to the price of coal, and we are unable to compete with foreigners."

The death of Mr. Samuel Thomas, colliery proprietor, whose age was 79, is announced. His funeral took place on Tuesday at Aberdare. Many of the workmen joined in the procession.

The case of Davis v. Taylor has been decided before the Master of the Rolls. An injunction was sought for by Messrs. D. Davis and Sons, of Cardiff, who are large shippers of Ferndale coal, to restrain Messrs. A. Taylor and Co. from selling their (the defendants') coal as "Ferndale coal." The defendants have recently sunk extensive collieries near the plaintiffs' collieries. The injunction was granted, and the defendants ordered to pay costs. The case of the Nant-y-Glo and Blaenau Co. v. Grave has been before the Court of Appeal. An application was made that the appeal which the defendant had lodged against the decision of the Court below should be dismissed for want of prosecution. The appeal was dismissed with costs.

The tidings from Cleveland have naturally caused some discussion among those who are in the steel trade. It has been alleged that a method has been discovered by which Cleveland ore can be utilised in the manufacture of steel. There is little probability, however, that this will seriously interfere with the local steel industry; at least those who know the district well fail to see why it should. For one thing, Spanish ore can be very cheaply imported here, and besides, the greatly reduced price of coal must be taken into consideration, as well as the cheapness of labour. The steelworks, as a rule, seem to be rather more actively employed. The usual complaints of the lowness of prices, both for steel and iron, continue, and with just cause. The iron trade is apparently a little more active. The clearances during the last few days have been much larger, the principal being to Brindisi (2280 tons), Cronstadt (1025 tons), Canada, and Brazil. Railway iron is somewhat quiet; bars are comparatively unaltered. About the usual quantity of Spanish ore comes to hand. The Tin-plate

industry continues to manifest an improvement. Prices are well maintained, and as an effect of better trade it is stated that the Kidwelly works are to be re-started.

The Coal Trade has been fairly active during this week. Shipments have been large, and there is a good demand for steam qualities; although colliery proprietors seem to hesitate about entering into extensive contracts, no doubt the North of England strike has given an impetus to trade here. Prices, though unchanged, are firmer, considering the time of year there is a good demand for house coals. Patent fuel is a little more active. A meeting of the Monmouthshire house coal delegates has been held at Blackwood. About 2000 men were represented. No decision was come to on the question of the proposed 10 per cent. decrease in wages, but it was resolved to assist the men on strike at the White Rose Colliery, New Tredegar.

TRADE OF THE TYNE AND WEAR.

April 30.—The Coal Trade is now very brisk on the North of the Tyne, and the great strike of miners still paralyses the trade on the south side of the river, and also on the Wear. At Sunderland and many other places the scarcity of coal is felt severely in many trades, and great numbers of men are laid off daily owing to this want in the iron, glass, chemical trades, &c. The shipments of Northumberland steam coal continue large. Some heavy cargoes have been sent to the East, and others are loading. The Russian and Baltic ports now being open, all the best steam coal pits have long turns, some of them three weeks. At the important meeting in Newcastle, on Saturday, upwards of seventy gentlemen attended who represented coal and iron firms in Durham. This was useful so far as it was a formal meeting, when the ideas of the leading men in the trade could be learned, but it was not expected that any new department would be taken on that day. Mr. David Dale proposed that the whole question should be referred to open arbitration, and 17 votes were recorded for this motion, and 50 against it. Another mode of settling the dispute was mooted, and this found some support, that is to appoint a committee on each side, and to give those committees power to settle the difference at a conference to be held for the purpose. The following resolutions were passed unanimously:—"This Association regrets that it has received no official answer to the communication sent to the Miners' Association on April 15." "It also regrets to see the erroneous statements made by the miners' executive in their addresses to the men as to what this Association actually does require of its workmen, which is either an immediate reduction of 10 and 7½ per cent. off underground and aboveground wages respectively, and the question of any further reduction to be decided by arbitration, or a reduction of 15 per cent. off underground wages and 10 per cent. off aboveground wages, that is with regard to the hewers, off the standard county wage of 5s. 0½d. and 4s. 8½d. for a seven and a half hours shift and a seven hours shift from bank to bank respectively, accordingly as the pits work 11 or 10 hours, and this together with free houses and fire coal. Under the rules of the two Associations the hewers at any colliery have a right to appeal to a joint committee, with Mr. Meynell, County Court Judge, as umpire, should their average wages fall 5 per cent. below 4s. 3½d. and 4s. per day, which would be the standard county rate should the latter of the two propositions be agreed to. At a subsequent meeting between a committee empowered to treat with engineers and a deputation from that body, a reduction of 6½ per cent., to take effect from the next pay at each colliery, was agreed to, the arrangement to continue for 12 months." One good effect of the strike has been the clearing off old stocks of coal. This has been done in many cases, large heaps of gas, cooking, and also small coal having disappeared. Many of these stocks have been sold at an advance of 2s. to 3s. per ton and upwards.

The most prominent event of last week in connection with the strike is the action taken by Messrs. Bell Brothers at the Brownays and Page Bank Collieries. They having decided to refer the matter in dispute to open arbitration, the men returned to work on Thursday. Sir W. Chayton, the owner of some works in South Durham, has also taken the same course. Some progress has thus been made towards a settlement of the dispute in detail, several firms having accepted the principle of open arbitration, and the men have started on those terms, and others are negotiating with a view to work on the same terms, while others, who will not agree to this, are endeavouring to get a moderate reduction, subject to future arbitration. At East Houghton Colliery the men started on Monday, all matters being referred to arbitration. Similar arrangements have been made at several other works—Blaydon Burn, Anwell Park, South Garesfield, &c.

Emigration has been rather brisk in these coal districts during the greater part of the present year, but the present strike has vastly accelerated the movement, and should it continue a sensible effect will be produced in the labour market on these rivers. At present a considerable number leave for Liverpool on Mondays and Wednesdays in each week.

It is stated that the miners of Northumberland have almost unanimously resolved to ask for an advance in wages. General suggestions have been made by the men as to the amount, but the committee have decided to ask for an increase in proportion to the recent advances in the price of coal. A joint meeting will probably be held on Saturday.

The dispute between the West Cumberland colliers and their employers, which has caused the strike of 3000 men, has entered on another step towards settlement. The owners have proposed that the employers and agents of the various collieries should meet their respective workmen with a view to settle the differences. This proposal the men have accepted.

A general meeting of the North of England Institute of Mining and Mechanical Engineers will be held on Saturday, when Mr. J. D. Kendall's paper, "On the Hematite Deposits of West Cumberland," will be open for discussion, and specimens of the rocks and fossils will be exhibited. Some new members will also be elected.

The iron market at Middlesbrough on Tuesday opened very quiet, and there was a dull feeling prevalent throughout. The sales of iron were few. Makers do not obtain the rates they mostly ask, and are not quite so firm as last week. The majority quote No. 3 at about 40s., but the transactions which take place are at about 38s. to 38s. 6d. No. 3 forge iron being 2s. to 2s. 6d. per ton less. There is much less demand for iron than was expected. Warrants have been quoted at 38s. 6d. to 39s.; 500 tons have been moved out of store since last Tuesday, the stock standing at 82,500 tons. The effects of the strike are seen in the reduced shipments to Scotland last week; only one-third of the usual quantity was dispatched, and to foreign ports there is a considerable diminution. It is not so much that there is not iron, but ironmasters are refusing to deliver on contract, as they are taking advantage of the strike clause; and in the case of Scotland especially, where foundry iron is chiefly required from this district, that quality is scarce and dear, and more money it is believed will be made of it by keeping it at home, there being such a small difference between Cleveland and Scotch prices. There are now it is reckoned 35 furnaces damped down out of the 85 which were in blast a month since, and most of the remainder are in slack blast. The make of iron is, therefore, reduced by much more than half. Not many of the finished ironworks have had to stop for lack of coal. Messrs. Fox, Head, and Co. have been obliged to lay off on that account, by which 500 men have been thrown out of work. Large numbers of men in connection with the blast-furnaces are idle. The Cleveland ironstone mines are doing but little. There has been a rumour prevailing in the district that a Sheffield firm is about to erect works at Middlesbrough for the manufacture of cutlery, presumably from the new Cleveland steel. Messrs. Bolckow, Vaughan, and Co.'s steelworks at Eton are kept in full work.

DURHAM, Thursday night.—Mr. Thomas Bradshaw, County Court judge, has given his award to-night in the arbitration between Messrs. Bell Brothers and their workmen. Messrs. Bell were the first firm to accept open arbitration. The firm claimed 7½ per cent. reduction, and it was believed by the Miners' Executive that the men would have to submit to a much greater reduction in standing to

the principle of open arbitration. The reverse, however, is the case, the award being for a reduction of 6½ per cent. from all rates paid prior to third pay of 1879. The arbitrators for the owners were Messrs. Bell, Stevenson, and Harle; and for the men Messrs. Crawford, Foreman, and Patterson.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

May 1.—Resuming our journey towards Bala, if we now look across the valley of the Dee to our left we shall see the limestone quarries of the Walter Eddy and of the Chirk Castle Company at the Vron. These are worked in the upper portion of the middle group of the beds of the limestone belt that extends from Llanymynech on the south to the Great Ormes Head on the north. A great east and west fault comes down the north side of the valley here, which has pushed this limestone belt with all its overlying rocks ½ mile to the east, so that we have to travel that distance before we gain the first of the Trevor limestone quarries on our right. There is a fine range of these, those in the uppermost beds having been worked for many years by the Messrs. Wright, and those in the lower beds, further on towards Llangollen, by the Llangollen Lime and Fluxing Stone Company, until recently under the management of the late Mr. Isaac Williams, whose successor is Mr. Stephen Toye. The worst of these quarries is that they are spread over too large an area, and that they are gradually defacing the grand limestone escarpment of the Eglwyseg rocks. The stone from the upper beds makes good agricultural lime, so does that from the lower beds. This, however, is largely used for fluxing purposes. A few miles to our right the great lead mining district of Denbighshire and Flintshire begins. As we traverse the Eglwyseg rocks we soon come to numerous trials for lead. We pass the Plas Eglwyseg and Pool Park Mines, and reach the Miners, and then on by Llanarmon, Mold, and Holywell to the Talargoch Mines, near Rhyl. As we reach the town of Llangollen, famous for flannel manufactures and breweries, we pass off the mountain limestone over a thin edge of the Devonian sandstones to the underlying Wenlock shale and Denbighshire grits, with just a capping of Ludlow rocks, with fossils on the top of Dinas Bran and some of the other hills. A great many attempts at mining for lead have been made in these hills around Llangollen, but here as elsewhere, they have been unsuccessful. A few lumps of lead met with occasionally have lured the "practical" but unlearned miners on, but the inevitable result here, as elsewhere, has been more barytes than lead. Between Llangollen and Benoyon stations, across the river on our right, we see the Pentrefelin Works of the Llangollen Slate and Slab Company. The slate and flagstone quarries are four or five miles up in the mountains, and we just see them on our right after we emerge from the tunnel further on. The blocks are brought down by a tramway with inclines to the works by the river side, where they are dressed into slabs for many purposes. The works are also on the banks of the canal, and are connected with the Great Western Railway by a siding. They are under the judicious management of Mr. John Paul, with Messrs. John Taylor and Sons as chiefs. As we reach the station with the unpronounceable name of Glyndyfrdwy we see the incline extending towards the new slate quarries around Moel Ferna, and just beyond the next station, Carrog, we reach the wharf and siding of the Penarth Quarries. The three last-named quarries are worked in the slate rocks of the Wenlock shale, which are the uppermost slate rocks of North Wales.

After we pass the town of Corwen we see, near the confluence of the Rivers Dee and Alwyn, the limestone quarries of Hafod. These are interesting, inasmuch as they are worked in an outlier of the belt of carboniferous limestone referred to before. The beds here exposed correspond to the main ridges, with which this small portion was at one time evidently connected, though now through dislocation and denudation it is left standing alone.

We are now in the Vale of Ederion, and we are travelling along the course of one of the greatest faults of the kingdom. This fault, known as the Yale fault, starts from Cardigan Bay, between Towyn and Barmouth, and traverses the country eastward until it is lost under the New Red Sandstone plains of Cheshire. In its eastern portion it has thrown up the carboniferous limestone and millstone grit of Hope Mountain and Cegwrie, which now divide the coal fields of Denbighshire and Flintshire from each other. On reaching Llanfelfel station we may see loading in the siding some dark looking mineral in rounded lumps like compressed coke. This is phosphate of lime from the Berwyn Mine, which is worked on the Berwyn Mountains, five miles on our left, and it is carted to this station. It now yields from 50 to 52 per cent. of phosphate of lime, and for its percentage contains less deleterious matter than most foreign phosphates of equal strength. It deserves to be better known and appreciated than it is. The next station is Bala, which is the termination of our journey for the present. We can imagine a pleasant evening at the White Lion before we part, and if my readers would like an occasional trip of the sort I shall be glad to accompany them.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

May 1.—So far as regards the lead mines in Derbyshire there appears to be nothing to report, so routine in character are they and their belongings. There are no new works undertaken so far as one can hear, nor are there any of the old mines being reopened in addition to what has been previously noticed. A considerable tonnage of ironstone continues to be imported from Northamptonshire, and there is very little doubt but what the recently discovered process of making steel direct from ordinary ironstone will be adopted at several places, for few will care to make pig-iron as at present, and at the price it will have to be sold at in the future. There are still a good many furnaces out in different parts of the county, and these are not likely to be blown in just at present, seeing the present production is more than is required, for considerable stocks are still held by makers. Prices, too, are still low and unremunerative, so there are no inducements whatever for increasing the production. In manufactured iron business goes on much as usual, the demand being still limited, more particularly for mill material, whilst the foundries are by no means busy. At Ripley trade is still depressed, so much so that it is thought likely the erection of a market hall and public offices recently agreed upon will be postponed till times improve. At the principal collieries the trade has been very fair for the time of year, and the Midland Railway Company has taken a very large tonnage of household coal to the South. This is accounted for by the strike in Durham, which has sent merchants into the inland districts who formerly obtained the larger portion of their supplies by sea. How long this will last depends upon the North Country colliers and their means of resistance, and we may fairly assume the end cannot be so very far off, seeing it must take a large sum weekly to provide for the thousands who are now voluntarily idle. Be that as it may the strike benefits thousands of miners, and has been the means of some colliery owners withdrawing the notices they gave to their men for a reduction of wages. Some little improvement has taken place in the business doing in "hard" coal, but there has been no change with respect to other sorts, which are anything but easy to sell. Cokemakers in some instances have been doing rather more than they did for smelters.

Some of the manufacturers in Sheffield have been able to keep their hands more fully employed, although there are still many workmen unemployed in different branches. Bessemer rail makers are working very well, and, singular to say, a large order has come to the town from M. Vanderbilt, of the New York Central Railway, despite the drawback that there is in heavy carriage rate to the seaports of Liverpool or Hull. But it shows that our rail makers are still able to hold their own, even against those who have the great advantage of a shipping port close to their works. Very little is being done in ordinary iron rails, and it is evident that before very long they will be almost unknown. Ship and boiler plates are in fair request, and some large tyres are also being turned out, although this branch may be said to be still quiet. For Germany more has been done of late in general goods, but orders from other parts of the Continent have come in very slowly. Cutlery is still

in but moderate demand, and few houses are anything like busy, the best off being those engaged in the better class of table and pocket knives. Makers of sheep shears are now working regularly, and a dispute in this branch has terminated by the men giving way. Foundry material is in comparatively limited request for stoves and grates, but at some places there is a considerable output of pipes and plain castings, whilst a dispute at one large establishment at Rotherham with respect to the working hours has, it is said, been arranged by an agreement to work 57 hours per week.

Several of the Sheffield manufacturers have sent off cases of their goods to the Exhibitions at Melbourne and Sydney during the week, so that the products of the town will be well represented. Messrs. Spear and Jackson sent a most complete assortment, said to be one of the finest collections that has been got together. Messrs. Stevenson, Mawood, and Co. send a variety of edge tools, axes, files, &c., and it is said that Sir J. Brown and Co. will send an assortment of their well-known products to both Exhibitions.

The men employed at the Phoenix Bessemer Works of Messrs. Taylor and Hampton (Limited), numbering upwards of 800, have received notice to leave. It is believed that this is preliminary to asking the men to submit to a reduction of wages.

The cutlery exhibition, to be held in London, has been well supplied with a choice selection of Sheffield manufactures. Amongst the exhibitors are Messrs. Fenton and Sons, of the Sykes Works, well known for their steel patent wheels, who have just forwarded a choice assortment of cutlery, whilst Messrs. Gornell and Son have forwarded a case of scissors.

PROPOSED AMALGAMATION OF MINERS' ASSOCIATIONS.—On Monday there was a meeting in Barnsley of representatives of the South Yorkshire and North Derbyshire and the West Yorkshire Miners' Associations, for the purpose of coming to terms as to amalgamation. The preliminaries were amicably arranged, and there is no doubt but what the two bodies will become one.

It has been stated in several papers that a conference is about to be held at some town in Yorkshire for the purpose of considering the desirability of restricting the output of coal by setting down the collieries for a month or six weeks. No authority is given for this statement, and it is questionable if there is any foundation for it.

Mr. Hollway has been making some further experiments at the Atlas Works, Sheffield, of his process for the utilisation of sulphides. On the last occasion his attention was directed principally to the procuring of a good regulus without the loss of much copper in the slag. Some further experiments, it is said, will be made at the same works.

The award with respect to the reduction of miners' wages in South Yorkshire and North Derbyshire has not yet been given, but it is expected to be made known almost any day.

REPORT FROM THE FOREST OF DEAN.

May 1.—The contention and strike of miners at northern collieries have had the effect of giving a little impetus to our local coal trade—but we might justly use the language used centuries ago in reference to a very different event which had produced a few bounties—"What are they among so many?" Of course such revivals are only temporary, as when the causes are removed the effects cease, except in a very modified degree. What we mean is this—that an influx of orders anywhere, occasioned by disputes in other districts, when the disputes are adjusted, merchants to some extent return to their former connections, but not entirely so, as some have an aversion to frequent changes, and if driven to form new connections, and they prove satisfactory, they continue their custom. These effects are some of the compensating circumstances arising out of the evils of social and mercantile confusions. The general flatness of our local trades has caused large numbers of men to turn their thoughts and desires towards the colonies; but, unfortunately, the Colonial Governments have just suspended emigration for a time. But as indicating the state of our labour market, we may mention the fact that one of the head colonial offices in London received by one postal delivery one morning towards the end of last week more than 1000 applications for passages. It is to be hoped that the offices will soon re-open for issuing forms to candidates; as it is, it seems deplorable that the doors to inviting and roomy colonies should be closed against those who are anxious to obtain an honest living by industry.

The local tin works are said to be fairly supplied with orders, notwithstanding that there is still a dispute respecting 6d. per ton, which was taken off by mutual consent some time ago. This, however, refers to the works of Messrs. Thom's, of Lydney and Lydbrook, and not to Mr. Chivers' works in connection with Hawkwell Colliery. There is no dispute at his works, but affairs work in harmony there, the number of hands engaged there being over 100, and as soon as the additional apparatus are completed, which will be in a month or so, the full complement will be just on, which will be close upon 200. We visited these works yesterday, and observed the order and activity at present characterising them. The Forest Vale Forge has also a fair supply of orders. Prices of iron and coal are lower than for many years past, and as indicating the state of the times proprietors of collieries and iron mines are contending for a reassessment, some urging that they produce iron ore at a loss, which applies to Edge Hill and Westburybrook Mines. The guardians on Tuesday last lowered the charge on the produce at Shakemantle from 1s. to 10d. per ton. As showing the same tendency to depreciation some small collieries have recently been offered for sale, and we understand that others, too, may come into the market. It does not pay to work small collieries when prices are low, as a rule, but there are some pleasing exceptions. The great hope of the Forest, as far as the coal trade is concerned, is the Severn Bridge, which it is expected will be opened in the course of the summer or autumn.

TECHNICAL EDUCATION IN JAPAN.

The useful work being done by the Imperial College of Engineering (Kobu-Dai-Gakko), Tokyo, has been noticed on previous occasions in the *Mining Journal*, and the current Calendar of the College, just to hand, shows that satisfactory progress continues to be made. The college has been instituted upon liberal principles, and with a view to make it of the utmost possible advantage not only to the students who attend the classes but to the nation at large, for it will secure an efficient staff of highly educated Japanese engineers for service in the Department of Public Works, and thus render Japan independent of outside assistance. The extent to which the teaching of the college is appreciated may be judged of from the fact that there are at present 227 cadets in the college, and 370 workmen and apprentices at Akabane.

The placed lists last prepared show that in connection with the courses of engineering for fourth year students, eight gentlemen, amongst whom Kobayashi Hachiro holds the first place, have been doing good work in office and field duties and in the civil engineering. In the class of hydraulics Harada Torazo is senior, and 18 others have obtained places. The same gentleman heads the list for mechanical engineering, and in both cases Yasunaga Yoshiaki stands next. Of the third year students in the examinations in structures, Sato Shigenori stood first and Mano Bunji second, nineteen other students being placed. In the examination in steam for civil, mechanical, and mining engineers, Kishi Tai took the first place, whilst Hattori Shunichi and Sato Shigenori were bracketed second, 23 others being placed. In surveying (civil and mining engineers and architects) Sato Shigenori was again first, gaining 91.6 per cent. of the marks, Asuke Yoshiwo coming second with 90.2 per cent.; there were 18 others placed. In telegraph engineering Iwata Takeo was first as a fourth year student, and Nakano Hatsu-sune as a third year student. As fourth year students Tsukiyama Sotaro was first both in analytical and applied organic chemistry; as third year students Kawakita Michitada, Nakagawa Chituro, and Haga Tamemasa were first, second, and third respectively in both classes. In the mining engineering class Hayashi Raijico was first, and five others were placed. Oki Tatsuo was first of 18 placed in metallurgy and of 11 placed in mining; Ogashima Hatashi following him in the first place and Kuwabar Masa in the second.

The last-named gentleman stood first in mineralogy and crystallography. First places in mineralogy were also taken by Sakamoto Matasune and by Tsuno Toyonishin. In geology and lithology Nakagawa Chituro and Sugata Shosaburo took first classes. In the higher natural philosophy Kujioka Ichieuke was first, followed by Kumakura Kosaku, who took the first place in applied mathematics and the third in pure mathematics, in which latter subject Usui Toichiro was first and Kadori Taki second, 27 in all being placed.

From the examination papers by which the progress of the students is estimated, it is evident that every care is taken to give them such instructions as shall be of the utmost possible utility to them; and as the courses are carefully arranged to suit the requirements of those preparing for civil, mechanical, or mining engineering, for chemists, metallurgists, or shipbuilders, it is easy for every student to learn all that he is likely to want without being compelled to study that which he will probably never require. The engineering workshops at Akabane, attached to the college, are scarcely less useful than the college itself, for in them can be obtained that sound practical knowledge that can only result from actual work at the bench, and without which the most complete scientific instruction can be of very little value. The manner in which the college is conducted appears to be scarcely capable of improvement, and the Japanese may certainly be congratulated upon the permanent advantage which it is conferring on the country.

THE COPPER TRADE.

Stocks in Europe:—	Tons.
Chillies and regulus, Liverpool & Swansea (equal to fine).....	3,987
Chilli bars in Liverpool.....	21,604
Chilli bars in Swansea.....	3,218
Foreign copper (chiefly Australian) in London.....	6,646
Chilli bars in London.....	1,167
Chilli bars and ingots and Barilla in Havre.....	4,645
Other copper in Havre.....	300 = 41,648
Afloat and chartered from Chilli to Europe (advised by mail):—	
Ores and regulus (equal to fine).....	2,649
Bars and ingots.....	4,652 = 7,301
Afloat from Australia (advised by mail):—	
Afloat and chartered from Chilli to Europe (advised by cable):—	722
Fine copper.....	2,600
Total.....	Tons 52,371

Leadenhall-street, May 1.

HENRY R. MERTON AND CO.

Chilli copper charters for the second half of this month were 3100 tons, consisting of 2100 tons bars and 850 tons furnace material for England, and 150 tons bars for the Continent. During the fortnight a considerable business was done in bars at 88½. 10s. down to 86½ per ton; showing that the war on the Coast instead of enhancing values, as many supposed it would do, has so far had a contrary effect. The quotation to-day for good ordinary brands is 86½ per ton. In furnace material the transactions comprise 325 tons Chilian regulus at 11s. 9d., 395 tons Bolivian regulus at 11s. 3d., 393 tons Bolivian ore, and 100 tons New Quebrada ore at 11s., 510 tons Cape ore at 11s. 1d., 150 tons Spanish precipitate at 11s. 3d., 50 tons English precipitate at 11s. 9d., and 50 tons at 11s. 6d. per unit. Arrivals here during the fortnight of West Coast, S. A., produce:—Cannana, from Valparaiso, 53 tons bars; Valparaiso, from Valparaiso, 240 tons bars and 107 tons ingots; Chilena, from Caldera, 800 tons regulus; Coronel, from Pena Blanca, 590 tons regulus; Hawkeye, from Carrizal, 720 tons regulus; Lord Marmon, from Molendo, 425 tons ores.—At Swansea:—NVL. Stocks of copper (Chilian and Bolivian) in first and second hands, likely to be available, we estimate at—

	Ores.	Regulus.	Bars.	Ingots.	Barilla.
Liverpool.....	2173	—	21,604	—	—
Swansea.....	1447	6143	3,249	—	—
Total.....	1447	8216	24,853	—	—

Representing about 28,840 tons fine copper, against 29,147 tons April 15; 19,660 tons April 30, 1878; 15,305 tons April 30, 1877; 9543 tons April 30, 1876. Stock of copper contained in other foreign ore and Spanish precipitate, 1231 tons fine. Stock of Chilian copper in Havre, 4289 tons fine, against 8579 tons April 30, 1878; stock of Coro Coro barilla in Havre, 475 tons fine, against 1515 tons April 30, 1878; stock of Chilli copper afloat and chartered for to date, 12,400 tons fine, against 9000 tons April 30, 1878; stock of foreign copper in London, chiefly Australian, 6640 tons fine, against 6600 tons April 30, 1878. According to the Board of Trade Returns the total imports and exports into and from this country for the three months of the following years were:—

	1877.	1878.	1879.
Imports.....			
Copper in ores.....	2,394	2,353	2,464
Regulus.....	1,505	4,113	6,371
Ingots, bars, cakes, and ingots.....	19,170	8,988	11,697
In pyrites (estimated).....	4,604	3,815	3,308
Total imports.....	21,673	19,267	23,840

	1877.	1878.	1879.
Exports.....			
English copper, wrought and unwrought.....	5,624	8,574	7,359
Foreign copper, unwrought.....	4,788	3,367	3,570
Yellow metal.....	4,492	4,011	3,873
Total exports.....	14,904	15,952	14,802

Liverpool, April 30. HARRINGTON, HORAN, AND CO.

The Chilli-Bolivian war caused a little stir early in the month, but this soon subsided into extreme apathy, waiting the result of the public sales of Australian. These sales not furnishing an encouraging present or future, the market continues to drag. Charters from April 9 to April 25 were advised as 3100 tons. We quote—Chilli bars, 55½. 15s.; Wallaroo, 63½.; Burra, 62½. 15s.; tough, 61½. 10s.; manufactured, 65½. to 67½.; ore and regulus, 10s. 9d. to 11s. 9d. per unit. The imports and exports for three months, January to March were, by the Board of Trade Returns:—

	1879.	1878.	1877.
Imports.....			
Ore.....	18,955	18,096	18,421
Regulus.....	10,791	8,226	9,010
Copper.....	11,697	8,988	10,170
Exports.....			
Foreign raw.....	3,570	3,367	4,778
English raw.....	3,895	5,603	2,798
Manufactured, including yellow metal and brass.....	7,355	6,981	7,368

London, May 1. FRENCH AND SMITH.

THE TIN TRADE.

	Mar. 31.	April 30.	April 30.	April 30.
	1878.	1879.	1878.	1877.
Straits and Australian, spot.....	9,783	9,549	8,438	8,514
Do, landing.....	298	878	851	—
Straits afloat.....	650	875	745	320
Australian, afloat.....	1,703	1,556	2,190	2,460
Banca, on warrants.....	2,052	1,744	1,144	990
Billiton, spot.....	2,101	2,178	1,853	1,128
Do, afloat.....	1,050	1,150	1,300	1,030
Australian tin in Holland.....	297	236	428	700
Total.....	Tons 17,914	17,963	16,966	15,607

	1878.	1879.	1878.	1877.
Deliveries during the month in				
London.....	1,054	1,029	902	713
Do, Holland.....	630	795	703	783
Total.....	Tons 1,684	1,824	1,605	1,496

	1878.	1879.	1878.	1877.
Shipments during the month from				
Straits.....	425	475	878	220
Do, Australia.....	700	670	840	810
Total.....	Tons 1,125	1,145	1,718	1,030

	1878.	1879.	1878.	1877.
Shipments from Straits to London.....	1,925	1,780	1,540	1,450
Shipments from Australia to London.....	2,575	2,875	3,202	2,991
Deliveries of foreign tin in London.....	4,333	4,128	2,991	2,991
Banca in Trading Company's hands and afloat, 1791 tons.				

London, April 30. A. STRAUSS AND CO.

Our tin market has been decidedly quieter during this month, and with a slow demand for consumption and diminished speculative buying operators for a rise have not succeeded in upholding prices. When the result of the Batavia sale on the 15th inst. became known a speculative demand for Billiton for forward delivery sprang up, but the same very soon subsided. The superabundance of the metal notwithstanding, it would appear that the large holders are as sanguine as ever with regard to a further advance of prices. This may be safely concluded from the fact that the present heavy stocks, both here and in London, continue to be very firmly held. Banca has been in limited demand for export, and warrants ex last sale were freely offered, more especially when the 26th inst., the prompt-day, fell due. The price declined from 42½ to 41½. There are now no sellers below 41½. The next sale will take place towards the end of May. Billiton has been in moderate request from 41½ to 41. Forward deliveries have been mostly enquired for, 42½ being paid at one time for October delivery. There are now buyers of parcels on the spot at 41½, late deliveries commanding ½ more: 12,000 peculia Billiton offered in public sale at Batavia, on the 15th inst., fetched the average price of 45-98 fls., costing to sell here about 41½ fls. per steamer. The ensuing sale, comprising the same quantity, will be held on Monday, June 9.

The position of Banca tin in Holland on April 30, according to the official returns of the Dutch Trading Company, was:—

Imports in April.....	1878.	1879.
Total four months.....	56,348	27,338
Deliveries in April.....	9,846	13,671
Total four months.....	37,026	39,994
Stock second hand.....	55,800	36,601
Unsold stock.....	35,888	16,207
Total stock.....	91,738	52,808
Afloat.....	Peculia 10,700	7,000

Statement of Billiton:—			
Import in April	Slabs 16,082	15,900	10,820
Total four months	45,282	45,245	32,367
Deliveries in April	4,287	4,287	4,072
Exclusive of 7300 slabs transhipped to America.			
Total four months	27,320	27,415	26,734
Stock	69,674	59,340	36,262
Afloat	17,000	12,000	16,000
Quotation Banca	41 1/4 d.	39 3/4 d.	42 1/4 d.
April 30. (Billiton)	41 1/4	37 1/4	41 1/4

These combined returns of Banca and Billiton for 1879, compared with those for 1878, exhibit an increase of the import for April of 824 tons; an increase of the import for the four months of 754 tons; a decrease of the deliveries for April of 211 tons; an increase of the deliveries for the four months of 99 tons; an increase of the stock second hand of 923 tons; an increase of the unsold stock of 617 tons; an increase of the total stock of 1540 tons; an advance of the quotation of Banca of 2 1/2 p. per ton.

The Government Returns for the months of January and February are—

EXPORT OF TIN FROM HOLLAND.			
	January.	February.	1877.
Germany	281	210	237
England	—	—	19
Belgium	89	110	192
France	17	15	18
Hamburg	—	48	25
United States	10	—	27
Other countries	—	5	4
Total	344	388	557

Rotterdam, April 30. EBBELING AND HAVELAAR.

There was no new feature in this market, and values showed only small fluctuations during the past month. In America there seems to be an active speculation going on, and the comparative low price of English has somewhat interfered with the consumption of foreign, but we understand that it is the intention of smelters to alter their terms of sale, which will bring the price nearer to that of foreign. Deliveries from London were 1030 tons, and from Holland 795 tons. Below we give our usual statistics:—

	1879.	1878.	1877.	May 1.
Foreign in London	10,061	10,618	9,292	9,150
Banca in Holland	2,000	1,744	1,144	928
Afloat for Europe, Straits, advised by mail	2,100	2,177	1,854	1,133
and wire	715	610	720	360
Afloat, Australian ditto	1,600	1,420	2,000	1,900
Afloat, Billiton	1,070	1,150	750	1,000
Banca in Dutch Trading Co.'s hands	400	1,121	808	820
Banca afloat, by sailing vessels	1,000	669	438	73
Total	19,086	19,469	16,704	15,374

May 1. FRENCH AND SMITH.

EXPANSION GEAR FOR STEAM ENGINES.

An engine constructed in accordance with the invention of Mr. C. DE NEGRI, of Stamford-street, which might be either high pressure or condensing, would have two slide valves, the principal one working in the ordinary manner the inlet and exhaust steam, whilst the back valve works the cut-off, either automatically from the governors or by a lever, wheel, or like arrangement at the command of the engine driver. To construct a horizontal, stationary, or portable high-pressure engine with this variable expansion gear, he casts or fixes two bearings on the back of the main valve, to carry the valve rod free to oscillate, but shouldered to prevent its lateral motion without the valve, leaving enough room for the back valve to work freely between the valve rod and main valve, by means of a screw or thread fastened on the valve rod, and working either into a nut or between two rollers fixed near the centre of the back valve. Now, following the valve rod out of the steam chest through the stuffing box, he has a part of it either squared or feathered into a bush, so that the rod can move laterally in the bush, and the bush can revolve or oscillate in a fixed bearing provided for it, without being itself able to be moved laterally. Proceeding further along the valve rod, he has attached to it a socket joint, into which a ball on the end of the eccentric rod fits, and which forms the connection between the eccentric and valve rods.

Returning to the above-mentioned bush, he has a short lever projecting from one of its shoulders, with a small roller free to revolve on the lever's end, and fitting freely in a cam, which, when made to revolve on a vertical axis, would impart, through the roller, to the short lever an intermittent rise and fall, causing the valve rod to oscillate, at regular intervals between each direction, in the outside bearing, stuffing box, and bearings on back of the main valve. Again, within this cam, he cuts a quick thread, into which the governor sleeve either screws or carries rollers that fit, the sleeve being mounted upon the governor spindle in the usual manner, and the governors being driven positively from the engine shaft. Now, if when the back valve is in one of its two extreme positions on the main valve, the one port or set of ports is open and the other shut, and when in the other extreme position, the other port or set of ports is open, and the first one closed, and if also the cam on the governors is so arranged, when the governors are down, as to cut off the steam, say at half stroke, it will be clear that, provided the thread on the governor sleeve, when drawn through the cam gives it a lead, the cut-off will come into action the earlier or later in proportion to the rise or fall of the governors. To construct other sorts of engines it can readily be understood how, according to circumstances, it might be arranged to vary the cut-off by means of a lever or hand wheel acting upon a similar bush to the sleeve of the governors.

NOVEL ROTARY ENGINE.—An improved rotary vacuum engine has been invented by Mr. L. B. LAWRENCE, of Monticello, California. It consists in an arrangement of curved tubes open at both ends, and supported by a wheel secured to a hollow shaft, and having tubular spokes, which project beyond the periphery of the wheel into the spaces between the curved tubes. The hollow shaft is supported by plunger blocks, which rest upon the sides of a water-tank, into which the curved tubes dip. One end of each curved tube is always left open; the opposite end is provided with a valve, which closes automatically as the open end touches the water. Opposite the open end of each curved tube there is a gas burner, which is pivoted to one of the tubular arms of the wheel, and is moved by a cam attached to the plunger block. This burner receives gas through the hollow shaft and arms of the wheel. The valves are operated by the same cam through levers. The pivoted burners are arranged with reference to a continuously burning stationary gas jet, so that the gas is let on as they come opposite the stationary jet, the latter serving to ignite the gas as it issues from the pivoted gas burners. As the mouth of the curved tube nears the water the valve is closed, and the burner is turned aside shutting off the gas supply. By the heat of the gas flame the air is rarified in the corresponding portion of the tube forming the periphery of the wheel, and as the curved tube strikes the water, the air is cooled, forming a partial vacuum, which draws the water into the tube causing that side of the wheel to preponderate, and inducing a rotary motion, which is continued so long as the gas is supplied and ignited in the manner described.

The following reports were received too late for insertion in their proper place.

PANDORA.—H. Nottingham, April 30: New Lode: The rise going up in end of the 33 south is looking well, worth 2 tons of lead and 1 ton of blende to a fathom; as may be expected, it is extremely wet, and we hope very soon to cut down all the water and thus dry the lode and winze above.—Goddard's Lode: The 33 end, going south, is yielding a little lead and blende, and shows indications of more open ground in advance of us. The same level going north is still in the hard bar of ground, and bad for breaking. There is no change in the feature or value of the stope opposite.—Shaft Cross-out: We have this month started another stope over this in the No. 1 winze, north of shaft cross-out; these two stops are worth on average from 12 to 15 cwt. of lead each and a little blende.—New Lode, 33 ft. level: No. 2 stope south continues to look well southward, and promises to extend further than our ends are yet driven, worth 1 ton of lead and 15 cwt. of blende to a fathom. I omitted to mention that we have during the past month had some hands driving the 23 end south occasionally when not engaged drawing and tramping stuff from No. 2 stope; the end is yielding a little ore, but not enough to value. I am of opinion there are other runs of ore ground in advance of this waiting to be opened up.—Goddard's Lode: The winzes sinking below the 23, on this lode, have become poor. No. 1 will be through to the 33 in another month, when a fresh piece of ore ground will be opened for stopping. No. 2 is suspended, as it appears to have crossed the run of the ore ground, which is dipping to the north. After stopping a piece of the north end, and we find the ore going down, we can resume the sinking in productive ground in time enough to meet the 33 coming south.—Surface: We have sampled 23 tons of lead and 20 tons of blende for sale next week. The dressing and pumping machinery is all working well.

In the Court of the Vice-Warden of the Stannaries. Stannaries of Cornwall.

IN the MATTER of the COMPANIES ACT, 1862, and of the WHEEL UNITY WOOD MINING COMPANY.—ALL CREDITORS or CLAIMANTS of the above-named company who have not received notice from the Official Liquidator thereof that their claims have been already admitted, are hereby required to COME IN and PROVE their SEVERAL DEBTS or CLAIMS at the Registrar's Office, Truro, on Saturday, the 10th day of May next, at Eleven o'clock in the forenoon, or in default thereof, they will be EXCLUDED FROM THE BENEFIT OF ANY DISTRIBUTION made before such proof. And for the purpose of such proof they are to attend in person, or by their solicitors or competent agents, at the time and place above mentioned.

FREDERICK MARSHALL, Registrar. Dated Registrar's Office, Truro, April 28, 1879.

In the Court of the Vice-Warden of the Stannaries. Stannaries of Cornwall.

IN the MATTER of the COMPANIES ACT, 1862, and of the WHEEL UNITY WOOD MINING COMPANY.—By direction of the Registrar of the said Court, TENDERS will be received by the Official Liquidator of the said company, at the Stannaries Court Office, in Truro, in the county of Cornwall, on or before the 10th day of May next, stating the highest price which will be given for the whole or any portion of the undermentioned

MACHINERY AND MATERIALS Now being at Wheel Unity Wood Mine, in the parish of Kenwyn, within the said Stannaries, and belonging to the said company—viz., ONE 70 inch cylinder PUMPING ENGINE, in excellent condition, with TWO 11 ton BOILERS. ONE 20 inch cylinder STAMPING ENGINE, 6 feet stroke, with two fly wheels and spur wheel, and ONE 10 ton BOILER. Two 16 horse iron stamps axles, with frames, heads, lifters, &c.; iron balance box, shears, and two elevators; horse wheel and wire rope; nineteen 20 inch pumps; 8 inch matchings; four 1 1/2 inch working barrels; one 17 inch and one 19 inch door-pieces; one 17 inch flat-bottom windbox; one 15 inch stuffing box and gland; pair of treble blocks and chain; beam and scales and weights; other mining material; office desk; and some account-house furniture. To inspect the above, apply to the person in charge at the said mine; and for further particulars to the said Official Liquidator, at the Stannaries Court Office, Truro. HODGE, HOCKIN, AND MARRACK, Truro (Agents for Downing, Paige, and Kelly, Redruth, Solicitors for the Official Liquidator).

Dated Stannaries Court Office, Truro, April 28, 1879.

PRELIMINARY ANNOUNCEMENT. IN THE MONTH OF MAY NEXT WILL BE OFFERED FOR SALE, BY AUCTION, in One Lot, as a going concern, the ESTATE and INTEREST of the

STAND LANE COLLIERY COMPANY (LIMITED).

In the MINES of COAL, SHAFTS, and UNDERGROUND WORKINGS, held by the company of the Earl of Derby, in the township of Pilkington, in the county of Lancaster, together with the

STEAM ENGINES, STRAM BOILERS, TUBS, RAILS, RAILWAY WAGONS, HORSES, CARTS, And all other the property and effects of the company, incidental to the working of their colliery.

In the meantime all necessary information may be had on application to ADAM MURRAY, Esq., the Liquidator acting in the voluntary winding-up of the company; or to Messrs. T. A. and J. GAUDY and Co., Solicitors, both of No. 104, King-street, Manchester.

BOWERS' ALLERTON COLLIERIES (LIMITED).

We hope shortly to be in a position to FIX THE DATE for the SALE of the above VALUABLE LEASEHOLD COLLIERIES, and announce the ISSUES of the PARTICULARS and CONDITIONS OF SALE.

HEPPER AND SONS, Auctioneers, Leeds.

PARTICULARS OF THE MOSTYN COAL AND IRONWORKS.

TO BE SOLD BY PRIVATE TREATY.

These extensive COLLIERIES and IRONWORKS are situated at MOSTYN, in FLINTSHIRE, on the banks of the River Dee. The COLLIERIES are in good working condition, and the present annual output of coal and Cannel is about 78,500 tons, which can readily be increased to 200,000 tons, and at that rate the quantity of coal ungot is estimated to be sufficient to last for 50 years.

The Mostyn Quay and Harbour is in the sole possession of the concern, and affords great advantage to the works in disposing of their produce, besides bringing in a revenue from the export and import of passengers, merchandise, and other goods.

Vessels of 900 tons are loaded and discharged here. Cargoes of iron ore from Spain, Ulverston, Ireland, and elsewhere can thus be brought at the lowest freights, the vessels returning with cargoes of coal. Ships up to 300 tons can berth close to the winding pits, and load coal at any ordinary tide.

The London and North Western Railway, from Chester to Holyhead, passes through the entire length of the coal field, and the collieries are connected with it by sidings at Mostyn Station, thus giving another outlet to all parts of England and Wales.

The sale of large quantities of slack is with many collieries a matter of great difficulty, but at Mostyn the slack and small coal from all the seams (except the Cannel slack, which is used for the boilers) can be converted into coke, and sold or used at the blast furnaces, whereby its maximum value is secured.

Attached to one of the collieries are brickworks in full operation, producing 20,000 bricks per week, and for which there is a constant market, in consequence of the conveniences of transit by water and rail.

In addition to the coal field already in work, there is a surface area of 700 acres which has not yet been worked, and is not included in the above figures. The section of this part of the coal field is of an extraordinary thickness, varying from 5 yards to 3 1/2 of a yard, altogether more than 68 feet thick.

The blast furnaces, consisting of two furnaces with plant of modern description, and coke ovens, are built on freehold, including 24 workmen's houses, and admirably situated for making high-class iron.

There is also a leasehold residence for the manager near the property. The beds of limestone in the neighbourhood, and within easy access, are almost inexhaustible, and of excellent fluxing quality.

The quantity of iron made by the two furnaces, when in blast, was 19,000 tons per annum.

The works, commanding as they do cheap labour, and easy access to Liverpool, are conveniently adapted for the conversion and manufacture of steel, or for rolling mills and forges, for which purposes there is ample space available on the freehold portion of the property.

The concern is well furnished with workshops, weighing machines, rolling stock, railway wagons, locomotives, engines, plant, and machinery, as well as two steamers and floating vessels.

Further particulars can be obtained from Messrs. GREGORY and Co., Solicitors, 1, Bedford-row, London; Messrs. WALKER and SMITH, Solicitors, Abbey Gate-way, Chester; Mr. J. E. EDWARDS, Town Hall, Chester; and Mr. H. E. TAYLOR, at the works.

FOR SALE, or terms will be made for the working, the celebrated

SABA SULPHUR PROPERTY, SABA ISLAND, DUTCH WEST INDIES, IN ALL ABOUT NINE HUNDRED ACRES, FIVE HUNDRED ACRES FREEHOLD, FOUR HUNDRED ACRES LEASEHOLD.

The beds of ore are opened on the freehold, known as the Great Hole Estate, in the district of Hell's Gate. The adjoining leaseholds are secured as the beds extend under them, and to prevent competition. The bed opened on is within 600 ft. of the shipping place; it is from 15 to 20 ft. in thickness, and of high quality—viz., from 30 to 70 per cent.—perfectly free from deleterious matter, as arsenic, lead, or copper, and is of a fine, rich, and the ore can be seen cropping out for fully half a mile in length. Nine cargoes shipped to America, as quarried from the cliff, gave results as follows:—

Name of vessel	Analyst	44-00
"	"	44-00
"	"	57-00
"	"	52-00
"	"	52-25
"	"	44-00
"	"	52-50
"	"	50-00
"	"	50-00

The average quality of the ore raised in the richest Sicilian Mines is under 20 per cent.

The Saba property having been in litigation for four years, has prevented its being worked; but the freehold and leasehold rights have been declared by the last Appeal Court at Curacao to be the property of—HENWOOD, MAC NISH, AND CO.

Who invite full inspection and investigation. Further particulars can be obtained by application to—T. MAC NISH, St. Kitts, W. I. Saba, West Indies, March 26, 1879.

TO MINING COMPANIES, &c.

FOR SALE (cheap), SECOND-HAND HORIZONTAL BEAM

AND PORTABLE ENGINES, all sizes, suitable for Winding or Pumping. CORNISH BEAM-ENDED AND VERTICAL BOILERS, PUMP LIFTS, T-BOBS AND GEARING, PIT-HEAD STOCKS, WIRE ROPES, and every description of PLANT for MINING PURPOSES, ready for immediate delivery.

Price Lists on application to—EDWARD RATOLIFFE, ENGINEER, HAWARDEN, NEAR CHESTER.

FOR SALE, A NEW 70 inch cylinder CORNISH BEAM

PUMPING ENGINE, 10 ft. stroke in cylinder and 9 ft. in the shaft, with steam case, metallic piston, and wrought gudgeon. The false cover, perpendicular pipes, weight posts, working and coaling gear all fitted bright. A strong substantial well made engine complete, including cast iron casing for top and bottom nozzles with right covers, holding down bolts and wrought-iron caps and bolts for connection to main rod.

Apply to WILLIAMS'S PERRAN FOUNDRY COMPANY, Perranarworthal, Cornwall. Dated Jan. 20, 1879.

COAL MINES REGULATION ACT, 1872.

EXAMINATION FOR MANAGERS' CERTIFICATES OF COMPETENCY.

DISTRICT UNDER THE CHARGE OF F. N. WARDELL, Esq., H.M. INSPECTOR OF MINES.

PERSONS desirous of being EXAMINED in this District for MANAGERS' CERTIFICATES OF COMPETENCY, under the above-named Act, should at once COMMUNICATE with the Secretary to the Board of the above-mentioned District, at the following address:—No. 5, Piccadilly, Bradford, Yorkshire. By order of the Board, JOHN R. JEFFERY, Secretary.

N.B.—Persons who do not reside within the District are equally eligible for examination with those who do.

COAL MINES REGULATION ACT, 1872.

EXAMINATION FOR MANAGERS' CERTIFICATES OF COMPETENCY.

DISTRICT UNDER THE CHARGE OF THOMAS WYNNE, Esq., H.M. INSPECTOR OF MINES.

PERSONS desirous of being EXAMINED in this District for MANAGERS' CERTIFICATES OF COMPETENCY, under the above-named Act, should at once COMMUNICATE with the Secretary to the Board of the above-mentioned District, at the following address:—Newcastle, Staffordshire. It is expected that the Examination will be held about the last week in June. By order of the Board, JOSEPH KNIGHT, Secretary.

N.B.—Persons who do not reside within the District are equally eligible for examination with those who do.

FORCH CRAGG LEAD AND BARYTES MINE AND WORKS, FOR SALE.

Situate at BRAITHWAITE, KESWICK, CUMBERLAND. TO BE SOLD (as a going concern), BY PRIVATE TREATY, the above VALUABLE MINE AND WORKS. The sett is a very large one, and contains veins of COBALT, MANGANESE, LEAD ORE, and BARYTES. A tramway runs through the sett, and there are two mills driven by water power (one recently erected and fitted up with powerful machinery), for grinding barytes; plant for bleaching barytes; set of stamps and water-wheel for crushing lead ore. The royalty is very low, and the dead rent, only £25 yearly, merging into royalty.

T. RICHARDS, Esq., F.G.S., Bond-street, Redruth, inspected the property on Oct. 4th, 1876, and his report, with any further information required, can be had by applying to J. STRAUGHTON, Main-street, Cookermouth, Cumberland.

IN LIQUIDATION.

WEST GODOLPHIN MINE.

ALL CLAIMS AGAINST THIS COMPANY must be forwarded to the Liquidators, at the offices of the company, 3, Great St. Helen's, London, on or before the 14th inst., or the same CANNOT BE RECOGNISED. (Signed) ROBERT WILSON, CHARLES THOMAS, Liquidators.

May 1, 1879.

HORIZONTAL ENGINE, 15-horse power, strong, and well-finished, with fly-wheel, wrought crank shaft 5 in. diameter, and massive box bed; suitable for winding or general purposes; quite new. Price £70.

HORIZONTAL ENGINE, 8 in. cylinder, beautiful and most improved design, new and complete, with pump and governor. £38.

ALEXANDER SMITH, ENGINEER, DUDLEY, WORCESTERSHIRE.

18 H.P. PORTABLE STEAM ENGINE with link motion, reversing gear, ready for delivery; also gear to wind and pump.

A 9-h.p. VERTICAL STEAM ENGINE, with link motion, reversing gear (winding drum if required). A 6-ft. PAN MORTAR MILL, VERTICAL ENGINE, and BOILER, with carriage and travelling wheels.

Apply to—BARROWS AND STEWART, ENGINEERS, BANBURY.

22 IN. AIR COMPRESSOR, on massive bed-plate, with slide bars, connecting rods, and crank, FOR SALE (CHEAP).

Improved AIR COMPRESSING ENGINES, with 12 and 9 in. cylinders. Also PAIR OF 9 inch WINDING ENGINES complete, with 4 feet drums, geared 3 to 1. Apply to—

WARSON AND HILL, ENGINEERS, NOTTINGHAM.

NICKEL AND COBALT REFINING AND GERMAN SILVER WORKS, 16, OZZELL STREET NORTH, BIRMINGHAM.

STEPHEN BARKER begs to inform the Trade that he has the following articles for sale:—REFINED METALLIC NICKEL. REFINED METALLIC BISMUTH. OXIDE OF COBALT. GERMAN SILVER—IN INGOTS, SHEET, WIRE, &c. NICKEL AND COBALT ORES PURCHASED.

GOLDENHILL COBALT, NICKEL, COLOUR, BORAX AND CHEMICAL WORKS.

NEAR STONE-UPON-TRENT, STAFFORDSHIRE JOHN HENSHALL WILLIAMSON, MANUFACTURER AND REFINER, Purchaser of Borate of Lime and Tincol.

MESSRS. TONKIN BROTHERS, MINING AGENTS, SURVEYORS, AND ASSAYERS, STANHOPE, DURHAM.

MINES INSPECTED AND REPORTED ON.

Mr. E. JACKSON, Associate of the Royal School of Mines, ANALYST AND ASSAYER.

Assays or Complete Analyses made of Copper, Silver, Lead, Zinc, Tin, and other Ores. ASSAYING TACKET. 106, QUEEN VICTORIA STREET, LONDON, E.C.

C. H. WALKER AND CO., MINING AGENTS AND ENGINEERS, VALPARAISO AND SAN IAGO CHILE.

THE BIRMINGHAM RAILWAY CARRIAGE AND WAGON COMPANY (LIMITED)

MANUFACTURE RAILWAY CARRIAGES AND WAGONS OF EVERY DESCRIPTION, for HIRE and SALE, by IMMEDIATE or DEFERRED PAYMENTS. They have also wagons for hire capable of carrying 6, 8, and 10 tons part of which are constructed specially for shipping purposes. Wagons in work order maintained by contract.

MANUFACTURERS also of IRONWORK, WHEELS, and AXLES. EDMUND FOWLER, Managing Director. WORKS, SMETHWICK, BIRMINGHAM.

FIRST QUALITY FIRE-PROOF CLAY.

For prices and particulars, address "H. C." care of Adams and Francis, Advertising Agents, 59, Fleet-street, E.C.

CAPTAIN ABSALOM FRANCIS, MINING ENGINEER.

GOGINAN, E.S.O., ABERYSTWYTH, CARDIGANSHIRE. Goginan, April 3.—The present time offers an opportunity for capitalists such as, in my opinion, that is not likely to occur again for very many a long year. To those who have acted on my advice since the commencement of the present year a rise has occurred in prices of shares equal to fully 60 per cent., and to those inclined to invest there are really probabilities that every £1 now placed will realise ten times the amount before this year closes. ABSALOM FRANCIS.

GEOLOGY.—In the Preface to the Student's Elements of

Geology, by Sir CHARLES LYELL, price 9s., he says—"As it is impossible to enable the reader to recognise rocks and minerals at sight by aid of verbal descriptions or figures, he will do well to obtain well-arranged collections of specimens, such as may be procured from Mr. TENNANT (149, Strand), Teacher of Mineralogy at King's College, London." These collections are supplied on the following terms, in plain mahogany cabinets:—

100 specimens, in cabinet, with 3 trays	£ 2 2 0
200 "	5 5 0
300 "	10 0 0
400 "	15 0 0

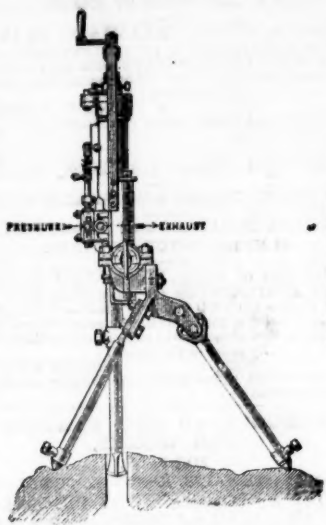
More extensive collections at 50 to 5000 guineas each. Mr. TENNANT gives instruction in Geology and Mineralogy at 149, Strand.

MONEY LENT, AT EIGHT, NINE, AND TEN PER CENT, on

FIRST MORTGAGE OF FREEHOLDS FOR IMPROVEMENTS and STOCKING, said freeholds in the Province of MANITOBA. Address, HENRY C. JONES, Solicitor, 20, Masonic Hall, Toronto.

"Cranston" Rock Drill

IS DRIVING LEVELS 200 LINEAR FEET PER MONTH IN HARD QUARTZ ROCK. "EBERHARDT" TUNNEL NOW DRIVEN IN OVER 3842 LINEAR FEET WITH THESE DRILLS AND COMPRESSORS.



CAN BE SEEN IN DAILY PRACTICAL OPERATION DRILLING 80 FEET OF BLAST HOLES PER DAY IN LIMESTONE ROCK AT ONE-FIFTH THE COST OF HAND LABOUR.

For other particulars and prices, apply to—

J. G. CRANSTON,
22, Grey-street, Newcastle-on-Tyne.

FRANCIS & JENKINS,
GREENFIELD WORKS,
LLANELLY, S. WALES,
MANUFACTURERS OF THE

Improved Solid Steel Shovels, C. S. Forks, Solid Steel Miners' Shovels, Railway and Miners' Picks, Steel-pointed Spades and Shovels, Draining and Grafting Tools, &c.

ALSO MANUFACTURERS OF

COPPER WORKS' LADLES,

To which special attention is given.

RABBLE HEADS, PADDLES, AND EVERY DESCRIPTION OF LIGHT HAMMERED WORK.



By a special method of preparation, this leather is made solid, perfectly close texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

HEPBURN AND GALE,
TANNERS AND CURRIERS, LEATHER MILLBAND AND HOSE PIPE MANUFACTURERS,
LONG LANE, SOUTHWARK, LONDON
Prize Medals, 1861, 1865, 1862, for
MILL BANDS, HOSE, AND LEATHER FOR MACHINERY PURPOSES.

WIREWOK, STAMP GRATES, SIEVES, & RIDDLES.

MERCHANTS, AGENTS, and others, requiring the above, will be SUPPLIED with a GOOD ARTICLE at LOW PRICES by
WILLIAM ESCOTT, MANUFACTURER,
TAVISTOCK.

TO MINERS IN NORTH AMERICA.

CHEMICAL LABORATORY AND GENERAL MINING OFFICES,

J. P. Phillips, M.E.
San Francisco.

EXAMINER OF MINES, MINERAL ASSAYER, &c.

Practical Instructions for Testing and Assaying, by Blowpipe, Chemicals, Crucible, Boorifier, &c.

Author of the "Explorers', Miners', and Metallurgists' Companion," a practical work of 672 pages, with 81 illustrations. Price, second edition, \$10-50.

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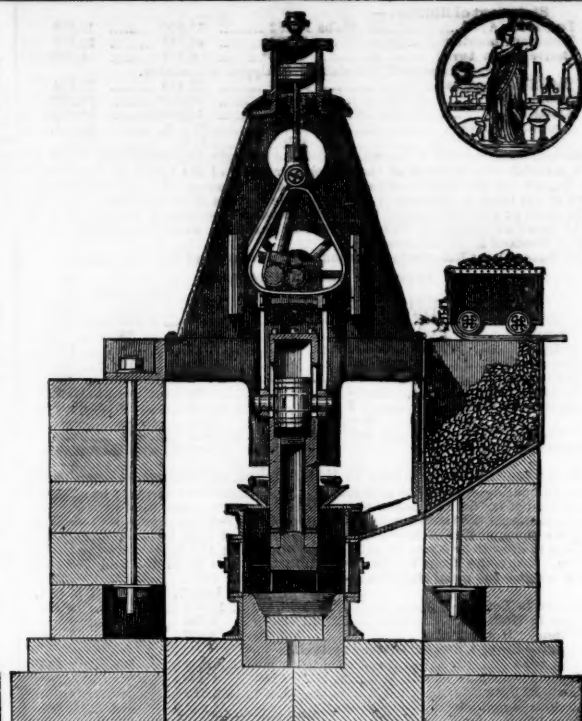
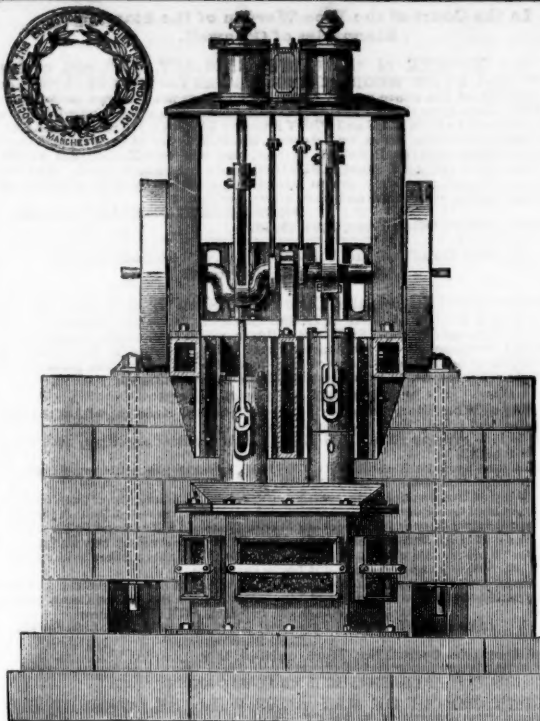
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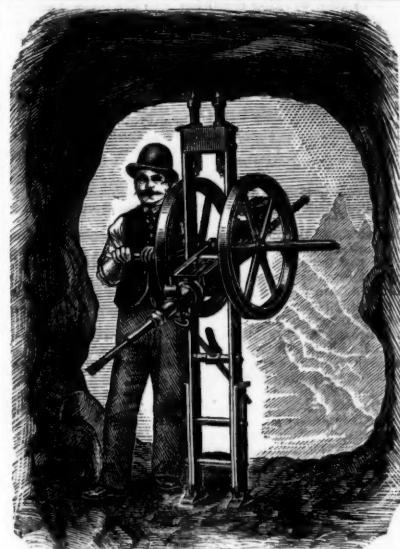
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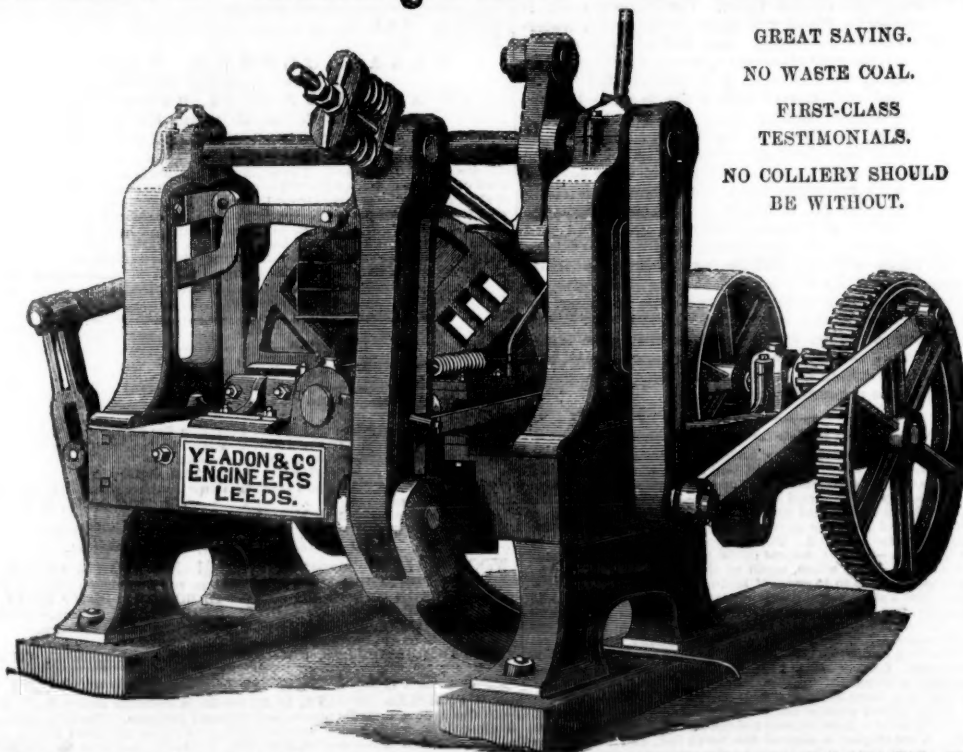
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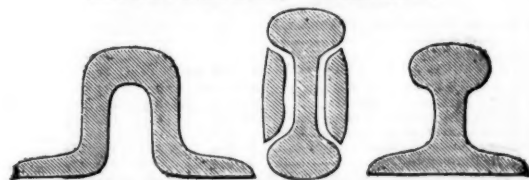
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